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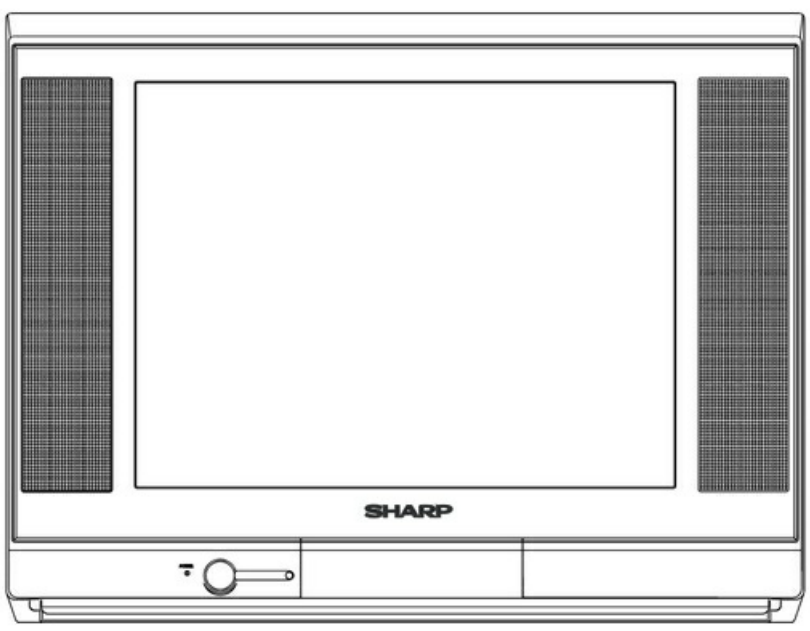
SHARP 21F-PA330I SERVICE MANUAL



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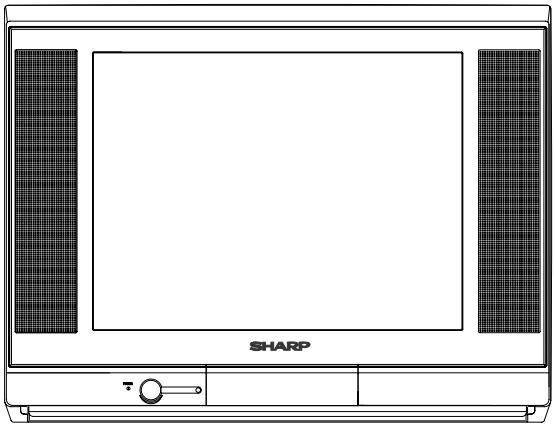
SHARP SERVICE MANUAL



COLOUR TALEVISION
Chassis No. GA-4

MODEL 21F-PA330I

In the interests of user-safety (Required by safety regulaton in some countries) the set should be restored to its original condition and only part identical to those specified should be used.

FEATURE

- PAL B/G System
- Full Auto Channel Preset and Auto Channel Skip
- 100-CH Program Memory
- CATV (Hyper Band) Ready
  <Used Frequency Synthesizer Tuner>
- Black Stretch Circuit
- On Timer / Off Timer / Reminder Timer
- Blue Back Noise Mute
- Front AV IN & Rear AV IN / OUT Terminals
- Front Headphone Jack
- Aperture Control Circuit
- Auto Fine Tuning
- Colour Comp Filter (NTSC Only)
- High Contrast Picture
- Hotel Mode
- 2 Language OSD
  (English / Thai)
- White Temperature Select
- Component In
- Surround Sound Effect
  <With Bass / Treble / Balance>
- AV Stereo

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WARNING

The chassis in this receive is partially hot. Use an isolation transformer between the line cord plug and power receptable, when servicing this chissis. To prevent eletriv shock, do not remove cover. No user-servieable parts inside. Refer servicing to qualified service personnel.

SHARP MENUFACTURING (THAILAND) CO.,LTD.

SPECIFICATIONS

Convergence.....Self Convergence System
Focus.....Electrostatic Focus High Bi-Potential
Sweep Deflection.....Magnetic

Intermediate Frequencies
Picture IF Carrier.....38.9 MHz
Sound IF Carrier Frequency
6.5 MHz.....32.4 MHz
6.0 MHz.....32.9 MHz
5.5 MHz.....33.4 MHz
4.5 MHz.....34.4 MHz
Colour Sub - Carrier Frequency.....34.47 MHz

Power Input.....110 ~ 240V AC 50/60 Hz
Power Consumption.....97 W
Audio Power Output Rating.....4 W(RMS) x 2

Speaker
Size..... 12 x 6 cm (2 pcs)
Voice Coil Impedance.....16 ohm at 400 Hz

Aerial Input Impedance
VHF/UHF.....75 ohms Unbalanced
Receiving System.....PAL B/G

Tuner Ranges
VHF - Channels.....E2 thru E12
UHF - Channels.....E21 thru E69
CATV - Channels.....S1 thru S20

Receiving Frequency.....48.5 MHz thru 863.25 MHz

Dimensions (approx.) .....Width: 618.0 mm
Height: 473.0 mm
Depth: 482.0 mm
Weight(approx): 23.0 kg

Cabinet material.....All Plastics

Specifications are subject to change without prior notice.

IMPORTANT SERVICE NOTES

Maintenance and repairing of this receiver should be done by qualified service personnel only.

1. SERVICE OF HIGH VOLTAGE SYSTEM AND PICTURE TUBE

when servicing the high voltage system, remove static change from it by connecting a 10K ohm resistor in series with an insulated wire (such as a test probe) between picture tube dag and 2nd anode lead. (AC line cord should be disconnected from AC outlet.)
1). Picture tube in this receiver employs integral implosion protection.
2). Replace with tube of the same type number for continued safety.
3). Do not lift picture tube by the neck.
4). Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage completely.

2. X - RAY

This receiver is designed so that any X - Ray radiation is kept to an absolute minimum. Since certain malfunctions or servicing may produce potentially hazardous radiation with prolonged exposure at close range, the following precautions should be observed:
1). When repairing the circuit, be sure not to increase the high voltage to more than 30.0kV(at beam 0 μA) for the set.
2). To keep the set in the in a normal opeartion, be sure to make it function on 27.0kV ± 1.5kV (at beam 1,000 μA) in the case of the set.The set has been factory - Adjusted to the above mentioned high voltage.
*If there is a possibililty that the high voltage fluctuates as a result of the repairs, never forget to check for such high voltage after the work.
3). Do not substitute a picture tube with unauthorizerd types and/or brands which may cause excess X - ray radiation.

3. BEFORE RETURNING THE RECEIVER

Before returning the receiver to the user, perform the following safety Checks.
1). Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the receiver.
2). Inspect all proteative devices such as non - mrtallic control knobs,insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor - capacitty networks, mechanical insulators etc.

ADJUSTMENT PRECAUTIONS

This model's setting in two different ways: through the I2C bus control and in the convention analog manner. The adjustments via the I2C bus control include preset - only items and variable data.

CAUTION: Make sore TV set in "Normal condition" before swich to Service Mode for adjustment.

1. Setting the service mode by the microprocessor.

(1). Setting the service mode by the microprocessor to set the TV set to SERVICE mode position, and the microprocessor is in input mode. (Adjustment trough the I2C bus control).
(2). Press the MENU key on the remote controller to get ready to select the mode (Adjustment mode, Setting mode, Check mode and Option mode) one by one.
(3). Press the CH DOWN/UP key on the remove controller to select the item in Adjustment mode or Option mode.
(4). Using the VOLUME UP/DOWN key on the remote controller, the data can be modified. Please wait approximately 200 msec for data storage in EEPROM before select to another mode.
(5). In check mode the data cannot be changes.
(6). Press the SERVICE key agian, it will swich to the NORMAL mode position, and the microprocessor is out of the SERVICE mode.

2. Factory Presetting.

(1). Power ON the set, press the SERVICE key on the remote controller, then press both CH UP and VOL UP button on the set simultaniously for 5 secs. Intial values are automatically preset, only when a new EPROM is used.
(2). The inital data are preset as listed in page 5-1 to 7-1.
(3). Make sure the data need modification or not (Initial data)
Precaution: If haven't done this initialization, it may possibly generate excessive Beam cerrent.

3. For reference please check with memory map RH - IXB225WJZZ (See attachment)

Note:

Presetting SERVICE mode (MANUAL)

(1). Short JA301 & JA410, then TV set will switch to the service mode position, and the microprocessor is in input mode. (Adjustment through the I2C bus control)
(2). Press the MENU key on the remote controller to get ready to select the mode (Adjustment mode, Setting mode, Check mode and Option mode) one by one.
(3). Press the CH UP/DOWN key on the remote controller select the item in Adjustment mode, Setting mode and Option mode.
(4). Using the VOLUME UP/DOWN key on the remote controller, the data can be modified. Please wait approximately 200 msec for data storge in the EEPROM before select to another mode.
(5). In check mode the data can not be changed.
(6). Disable the short of JA301 & JA410, it will switch to the normal mode (OFF) position, and the microprocessor is out of the sevice mode.

ADJUSTMENT ITEM

**Below are the adjustment items the should be done, PLS FOLLOW THE PROCEDURE. Otherwise some adjustment items will not be accurate.

NO ***	ADJUSTMENT ITEM	EFFECTIVE MODEL	REVISION
1	BUS SETUP	21F-PA330I	
2	OPTION SET UP		
3	H - VCO		
4	VIF - VCO		
5	S - TRAP fo		
6	RF - AGC		
7	PURITY ADJ		
8	CONVERGENCE ADJ		
9	FOCUS ADJ		
10	V - SHIFT (50 Hz)		
11	H - SHIFT (50 Hz)		
12	V - SIZE (50 Hz)		
13	SCREEN		
14	WHITE BALANCE		
15	SUB - BRIGHTNESS		
16	SUB - CONTRAST		
17	BEAM CURRENT CHECK		
18	SUB - TINT		
19	SUB - COLOR		
20	BEAM PROTECTOR CHECK		
21	HV PROTECTOR CHECK		
22	OTHER PROTECTOR CHECK		
23	AV OUT CHECK		
24	AV IN CHECK		
25	COMPONENT IN CHECK		
26	CONTRAST CONTROL CHECK		
27	COLOR CONTROL CHECK		
28	BRIGHTNESS CONTROL CHECK		
29	TINT CONTROL CHECK		
30	SHARPNESS CONTROL CHECK		
31	CH DISPLAY COLOR CHECK		
32	NORMAL DISPLAY CHECK		
33	WHITE TEMP CONTROL CHECK		
34	COLOR SYSTEM CHECK		
35	SURROUND CHECK		
36	TREBLE CHECK		
37	BASS CHECK		
38	BALANCE CHECK		
39	SOUND SYSTEM CHECK		
40	NOISE MUTE CHECK		
41	OSD LANGUAGE QUANTITY CHECK		
42	HEAD PHONE CHECK		
43	BILINGUAL FUNCTION CHECK		
44	SHOCK TEST CHECK		
45	ROM CORRECTION CHECK		

USER DATA IN SERVICE MODE

1). While SERVICE mode ON,EEPROM DATA will swich to the service data. Also, once SERVICE mode OFF, EEPROM will swich back to previous USER DATA.

2). In the service mode, the user data establish as below,

	USER DATA
CONTRAST	MAX (60)
COLOUR	CENT (0)
BRIGHTNESS	CENT (0)
TINT	CENT (0)
SHARPNESS	CENT (0)
WHITE TEMP	STANDARD
S-VOLUME	MIN
SURROUND	OFF
TREBLE	CENT (0)
BASS	CENT (0)
BALANCE	CENT (0)
BLUE BACK	OFF
C SYSTEM	AUTO
S SYSTEM	*1

*1: For each CH, data is same as before swich to Service mode.

The flow of mode list as following,

*Direct Key - in Mode for Service Items in Service Mode

RC CODE(HEX)	R/C KEY NAME	SERVICE - ITEM
80	POS 1	R-C UP (IN SERVICE MODE VOO)
40	POS 2	G-C UP (IN SERVICE MODE VOO)
C0	POS 3	B-C UP (IN SERVICE MODE VOO)
20	POS 4	R-C DOWN (IN SERVICE MODE VOO)
A0	POS 5	G-C DOWN (IN SERVICE MODE VOO)
60	POS 6	B-C DOWN (IN SERVICE MODE VOO)
E0	POS 7	R-D UP (IN SERVICE MODE VOO)
10	POS 8	B-D UP (IN SERVICE MODE VOO)
50	POS 0	B-D DOWN (IN SERVICE MODE VOO)
E4	FLASHBACK	R-D DOWN (IN SERVICE MODE VOO)
E4	FLASHBACK	Y-MUTE (BESIDES OF SERVICE MODE VOO)
75	WHITE TEMP UP	RF-AGC (V01)
F5	WHITE TEMP DOWN	VIF-VCO (V02)
C2	TUNE DOWN	H-VCO (V03)
8D	SHARPNESS DOWN	SUB-CON (V04)
D6	BALANCE LEFT	SUB-COL (V05)
0D	SHARPNESS UP	SUB-BRIGHT (V06)
36	BALANCE RIGHT	SUB-TINT (V07)
46	TREBLE UP	SUB-SHP (V08)
C6	TREBLE DOWN	SUB-COL-YUV (V09)
26	BASS UP	SUB-TINT-YUV (V10)
24	COLOUR UP	V-SIZE (V11), V-SIZE60 (V17)
54	BRIGHTNESS DOWN	V-SHIFT (V12), V-SHIFT60 (V18)
74	TINT DOWN	H-SHIFT (V13), H-SHIFT60 (V19)
66	SURROUND UP	SCM-BR (V14)
E6	SURROUND DOWN	SCM-BB (V15)
C4	CONTRAST DOWN	SUB-VOL (V16)
4C	PICTURE	S-TRAP-BG (V20)
CC	HOLD	S-TRAP-I (V21)
2C	TEXT	S-TRAP-DK (V22)
AC	CANCEL	S-TRAP-M (V23)
EC	SIZE	S-TRAP-574 (V24)
80	POS 1	R-C UP YUV (IN SERVICE MODE V25)
40	POS 2	G-C UP YUV (IN SERVICE MODE V25)
C0	POS 3	B-C UP YUV (IN SERVICE MODE V25)
20	POS 4	R-C DOWN YUV (IN SERVICE MODE V25)
A0	POS 5	G-C DOWN YUV (IN SERVICE MODE V25)
60	POS 6	B-C DOWN YUV (IN SERVICE MODE V25)
E0	POS 7	R-D UP YUV (IN SERVICE MODE V25)
10	POS 8	B-D UP YUV (IN SERVICE MODE V25)
50	POS 0	B-D DOWN YUV (IN SERVICE MODE V25)
E4	FLASHBACK	R-D DOWN YUV (IN SERVICE MODE V25)
C1		AUTO ADJ FOR V01, V02, V03, V20, V21, V22, V23, V24
CA		T-SET
81		SERVICE MODE

After set the MCL to MCL4, pease set the INITIAL SETTING to INITIAL 9.

INITIAL 9: For Thai (ALL channel Sound System are set to B/G)

MCL4 (HEX D5)		
CH-No	Fv (MHz)	Sound Sys
0		
1	55.25	B/G
2	175.25	B/G
3	189.25	B/G
4	203.25	B/G
5	217.25	B/G
6	535.25	B/G
7		
8		
9		
10		
11	48.25	B/G
12	62.25	B/G
13	196.25	B/G
14	210.25	B/G
15	224.25	B/G
16	471.25	B/G
17	855.25	B/G
18		
19		
20		
21	223.95	B/G
22	224.55	B/G
23	223.85	B/G
24	224.65	B/G
25	223.75	B/G
26	224.75	B/G
27		B/G
28		
29		
30		
31	91.25	M
32	103.25	M
33	171.25	M
34	183.25	M
35	193.25	M

MCL4 (HEX D5)		
CH-No	Fv (MHz)	Sound Sys
35	193.25	M
36	205.25	M
37	217.25	M
38	621.25	M
39		
40		
41		
42		
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70		

*NOTE : PLL DATA OF ABOVE FREQ SHOULD TAKE THE ACCOUNT OF PIF SETTING IN SERVICE OPTION O04 (VIF) BEFORE STORING INTO EEPROM.

SHIPPING SETTING & CHECKING

(1) The following default data has been factory-set for the E2PROM follow by INITIAL DATA selected.

ITEMS	DATA SETTING
LAST POWER	ON
LAST TV/AV MODE	TV MODE
LAST POSITION	CH 1
FLASHBACK CHANNEL	CH 1
1/2 DIGIT ENTRY	2 DIGIT ENTRY
VOLUME	0 (Min)
BLUE BACK	OFF
OFF TIMER	--:--
ON TIMER	--:--
ON TIMER POSITION	--
ON TIMER VOLUME	--
REMINDER	--:--
AFT	ALL CH ON
COLOR SYSTEM	ALL CH AUTO
SKIP	ALL CH OFF
NICAM ON/OFF	N/A
NICAM STEREO MODE	N/A
NICAM BILINGUAL MODE	N/A
NICAM MONO MODE	N/A
A2 ON/OFF	N/A
A2 STEREO MODE	N/A
A2 BILINGUAL MODE	N/A
CONTRAST	60
COLOR	0
BRIGHTNESS	0
TINT	0
SHARPNESS	0
WHITE TEMP	0
SURROUND	OFF
TREBLE	0
BASS	0
BALANCE	0 (CENTER)

INITIAL	LANGUAGE	SOUND SYSTEM
9	ENGLISH	B/G

FACTORY SETTING BY MODEL

(Reference : Geomagnetism Adjustment)

MODEL	MAGNETIC FIELD(V,H) nT		BACKGROUND	LANG.	S-SYS	LANG Q'TY
THAI	10,000	40,000	12300K	THAI	B/G	2

*NOTE FOR OSD TYPE:

2: THAI & ENGLISH ONLY

**AFTER INITIALIZED THE EEPROM (REFER TO FACTORY PRESETTING), READ DATA FROM EEPROM ADDRESS 00H ~ 03H,
AND COMPARE TO THE LIST BELOW, IF DEFERENT, INITIALIZE THE EEPROM.

ADDRESS	DATA	ADDRESS	DATA
00H :	**7BH**	02H :	**72H**
01H :	**72H**	03H :	**75H**

***There are four stages of service mode data. First stage from V00 - V31 (Adjustment mode).
To go into second stage of service mode data, press MENU key. Second stage data from F01 - F140 (Setting Mode)
To go into third stage of srevice mode data, press MENU key. Third stage data is Check Mode.
To go into fourth stage of service mode data, press MENU key. Fourth stage data from O01 - O30 (Option Mode)

ADJUSTMENT MODE (FIRST STAGE)

EEPROM ITEMS	OSD	DATA LENGTH	INTIAL DATA	FIX/ADJ/AUTO	RC CODE (HEX)
R-DRIVE	V00	0~127	63	ADJ	NOTE-1
B-DRIVE	V00	0~127	63	ADJ	NOTE-1
R-CUT	V00	0~255	127	ADJ	NOTE-2
G-CUT	V00	0~255	127	ADJ	NOTE-2
B-CUT	V00	0~255	127	ADJ	NOTE-2
RF-AGC	V01	0~127	50	ADJ	AE/174
VIF-VCO	V02	0~63	31	ADJ	AF/175
H-VCO	V03	0~7	3	ADJ	43/67
SUB-CONTRAST	V04	0~127	100	ADJ	B1/177
SUB-COLOR	V05	0~127	63	ADJ	6B/107
SUB-BRIGHT	V06	0~255	127	ADJ	B0/176
SUB-TINT	V07	0~127	63	ADJ	6C/108
SUB-SHARPNESS	V08	0~63	43	43	62/98
SUB-COLOR-YUV	V09	0~127	90	105	63/99
SUB-TINT-YUV	V10	0~127	63	63	64/100
V-SIZE 50Hz	V11	0~63	38	ADJ	24/36
V-SHIFT 50 Hz	V12	0~7	3	ADJ	2A/42
H-SHIFT 50 Hz	V13	0-31	9	ADJ	2E/46
SECAM-BR	V14	0-63	37	ADJ	66/102
SECAM-BB	V15	0-63	22	ADJ	67/103
SUB-VOL	V16	0~60	60	60	23/35
V-SIZE 60 Hz	V17	-31~0~+31	0	0	
V-SHIFT 60 Hz	V18	-7~0~+7	-1	-1	
H-SHIFT 60 Hz	V19	-15~0~+15	+2	+2	
S-TRAP (BG)	V20	0~15	7	ADJ	
S-TRAP (I)	V21	0~15	7	ADJ	32/50
S-TRAP (DK)	V22	0~15	7	ADJ	33/51
S-TRAP (M)	V23	0~15	7	ADJ	34/52
S-TRAP (5,74)	V24	0~15	7	ADJ	35/53
CUTOFF/BKGD YUV	V25				37/55
R-DRI YUV	V25	0~127	63	63	
B-DRI YUV	V25	0~127	63	63	
R-CUT YUV	V25	0~255	127	127	
G-CUT YUV	V25	0~255	127	127	
B-CUT YUV	V25	0~255	127	127	
SUB-CON YUV	V26	0~127	100	100	
SUB-BRIGHT YUV	V27	0~255	127	127	
VS-CORRECT	V28	0~63	32	36	
VC-CORRECT OFFSET	V29	-13~+13	0	0	
V LINEARITY	V30	0~63	32	10	
V LINEARITY	V31	-13~+13	0	0	

R/C KEY NAME	R/C CODE (DEC/HEX)
SERVICE	129/81
DAC	119/77
ONE COLUOR(RGB)	126/7E
BLUEBACK	59/3B
MCL4	171/AB
FEATURE	95/5F
TIMER	83/53
CONT UP	34/22
CONT DOWN	35/23
COL UP	36/24
COL DOWN	37/25
BRI UP	41/29
BRI DOWN	42/2A
TINT UP	45/2D
TINT DOWN	46/2E
SHARPNESS UP	176/BO
SHARPNESS DOWN	177/B1

R/C KEY NAME	R/C CODE (DEC/HEX)
MPX/BIL	24/18
INITIAL-9	238/EE
P-NORMAL	33/21
SYSTEM	111/6F
AUTO	131/83
S-MUTE (V-MUTE/RGBINITAIL)	23/17
-/-- (V-MUTE/RGB ADJ DATA)	60/3C
SURROUND	110/6E

IN V00 CONDITION

NOTE-1	
R-DRI UP	07/07
R-DRI DN	27/39
B-DRI UP	08/08
R-DRI DN	0A/10
NOTE-2	
R-CUT UP	01/01
R-CUT DN	04/04
G-CUT UP	02/02
G-CUT DN	05/05
B-CUT UP	03/03
B-CUT DN	06/06

PRESS MENU KEY (x1) IN SERVICE MODE , LIST BELOW WILL APPEAR

SETTING MODE (SECOND STAGE)					
EEPROM ITEMS	**FUNCTION**	**OSD**	**DATA LENGTH**	**INITIAL DATA**	**SET UP (DEC)**
C.CLIP-LVL	CLIP LEVEL CONTRAST CONTROL OF RGB INPUT	F01	0/1	0	0
RGB-CLIP	CLIPPING OF RGB CONTRAST CONTROL	F02	0/1	0	0
BS	BLACK STRECH	F03	0/1	0	0
ABCL	ABCL PROCESSING (ACL PROCESSING)	F04	0/1	0	0
ABCL-GAIN	ABCL PROCESSING GAIN	F05	0/1	0	0
S-OUT-LVL	AUDIO OUTPUT GAIN CONTROL	F06	0–127	95	95
VIF-G	P-IF DETETION GAIN OUTPUT	F07	0–7	4	4
SHPG	SHARPNESS GAIN	F08	0/1	0	0
SHPG-P	SHARPNESS GAIN PAL	F09	0/1	0	0
SHPG-S	SHARPNESS GAIN SECAM	F10	0/1	0	0
SHPG-N4	SHARPNESS GAIN N443	F11	0/1	0	0
SHPG-N3	SHARPNESS GAIN N358	F12	0/1	1	1
YDL	Y SIGNAL DELAY	F13	0–7	5	5
YDL-P	Y SIGNAL DELAY PAL	F14	0–7	5	5
YDL-S	Y SIGNAL DELAY SECAM	F15	0–7	7	7
YDL-N4	Y SIGNAL DELAY N443	F16	0–7	5	5
YDL-N3	Y SIGNAL DELAY N358	F17	0–7	5	5
YDL-AV	Y SIGNAL DELAY AV	F18	0–7	6	6
YDL-AV-P	Y SIGNAL DELAY PAL (AV)	F19	0–7	6	6
YDL-AV-S	Y SIGNAL DELAY SECAM (AV)	F20	0–7	7	7
YDL-AV-N4	Y SIGNAL DELAY N443 (AV)	F21	0–7	6	6
YDL-AV-N3	Y SIGNAL DELAY N358 (AV)	F22	0–7	6	6
YDL-YUV	Y SIGNAL DELAY YUV	F23	0–7	6	6
COL-AV	COLOUR OFFSET AV	F24	-31–0–+31	+10	0
COL-P	COLOUR OFFSET PAL	F25	-31–0–+31	0	0
COL-S	COLOUR OFFSET SECAM	F26	-31–0–+31	+9	+9
COL-N4	COLOUR OFFSET N443	F27	-31–0–+31	-8	-8
COL-N3	COLOUR OFFSET N358	F28	-31–0–+31	-7	-7
COL-ADJ	COLOUR OFFSET ADJUST	F29	-31–0–+31	0	0
SHP-AV	SHARPNESS OFFSET AV	F30	-31–0–+31	+5	+1
SHP-YUV	SHARPNESS OFFSET YUV	F31	-31–0–+31	0	0
SHP-P	SHARPNESS OFFSET PAL	F32	-31–0–+31	0	0
SHP-S	SHARPNESS OFFSET SECAM	F33	-31–0–+31	-5	-5
SHP-N4	SHARPNESS OFFSET N443	F34	-31–0–+31	0	0
SHP-N3	SHARPNESS OFFSET N358	F35	-31–0–+31	0	0
TINT-AV	TINT OFFSET AV	F36	-63–0–+63	0	-3
TINT-ADJ	TINT OFFSET ADJUST	F37	-63–0–+63	0	-5
TINT-YUV-ADJ	TINT YUV OFFSET ADJUST	F38	-63–0–+63	0	0
R-R	R-DRIVE OFFSET WHEN WHITE TEMP IS RED	F39	-63–0–+63	+8	0
B-R	B-DRIVE OFFSET WHEN WHITE TEMP IS RED	F40	-63–0–+63	-10	-9
R-B	R-DRIVE OFFSET WHEN WHITE TEMP IS BLUE	F41	-63–0–+63	-3	-6
B-B	B-DRIVE OFFSET WHEN WHIYE TEMP IS BLUE	F42	-63–0–+63	+13	+8
TRAP	CENTER VALUE OF CHROMA TRAP	F43	0–3	2	2
TRAP-P	CENTER VALUE OF CHROMA TRAP PAL	F44	0–3	2	2
TRAP-S	CENTER VALUE OF CHROMA TRAP SECAM	F45	0–3	2	2
TRAP-N4	CENTER VALUE OF CHROMA TRAP N443	F46	0–3	2	2
TRAP-N3	CENTER VALUE OF CHROMA TRAP N358	F47	0–3	2	2
1W-TV	VERT SYNC DETECTION MODE FOR AV (1 WINDOW/2WINDOW)	F48	0/1	0	0
1W-AV	VERT SYNC DETECTION MODE FOR TV (1 WINDOW/2WINDOW)	F49	0/1	1	1
V-FREE (NO SYNC)	SET VERTICAL TO FORCED FREE RUN MODE	F50	0/1	0	0
AFC2 (NO SYNC)	HORIZONTAL AFC2 GAIN	F51	0/1	0	0
GAMMA	GAMMA CORRECTION QTY	F52	0–3	0	0
BS-D/C	BLACK STRETCH CONTROL LEVEL	F53	0–15	10	10
BS-GAIN	BLACK STRETCH LEVEL	F54	0/1	0	0
OM-DET	OVER MODULATION DETECT	F55	0/1	0	0
SL-TV	SLICE LEVEL OF SYNC DETECTION	F56	0–7	2	2
SL-AV	SLICE LEVEL OF SYNC DETECTION TV	F57	0–7	4	4
SL-YUV	SLICE LEVEL OF SYNC DETECTION YUV	F58	0–7	4	4
VD2/VD1/AS/FBP-TV	VD2 & VD1-VERT SYNC DETECT MIN WIDTH MSB & LSB RESPECTIVELY, AS-TV/AV/YUV SWICH & CHCHANGE, FBP-FLYBACK PULSE SLICE LEVEL (TV)	F59	0–15	6	6
VD2/VD1/AS/FBP-AV	VD2 & VD1-VERT SYNC DETECT MIN WIDTH MSB & LSB RESPECTIVELY, AS-TV/AV/YUV SWICH & CHCHANGE, FBP-FLYBACK PULSE SLICE LEVEL (AV)	F60	0–15	14	14

SETTING MODE (SECOND STAGE)					
EEPROM ITEMS	**FUNCTION**	**OSD**	**DATA LENGTH**	**INITIAL DATA**	**SET UP (DEC)**
VD2/VD1/AS/FBP-YUV	VD2 & VD1-VERT SYNC DETECT MIN WIDTH MSB & LSB RESPECTIVELY, AS-TV/AV/YUV SWICH & CHCHANGE, FBP-FLYBACK PULSE SLICE LEVEL (YUV)	F61	0–15	14	14
VDL	COLOUR DIFF. INPUT PHASE ADJ	F62	0–3	0	0
UDL	COLOUR DIFF. INPUT PHASE ADJ	F63	0–3	0	0
AUTO-SCM-KIL-TV	SECAM COLOUR KILLER SENSITIVITY (TV)	F64	0–3	1	1
SECAM-BGP	INTERNAL SECAM BGP TIMING	F65	0–3	0	0
N45	INHIBIT 50Hz NTSC 4.43	F66	0/1	0	0
TXT-POS-H	TELETEXT HORIZONTAL POSITION	F67	0–63	30	30
TXT-POS-V	TELETEXT VERTICAL POSITION	F68	0–63	34	34
OSD-POS	OSD POSITION	F69	0–127	9	9
CP	CHARGE PUMP	F70	0/1	1	1
SMALL-SURR	SURROUND MODE SELECT	F71	0/1	0	0
SUB-BASS	SUB BASS CONTROL	F72	0–7	6	6
SUB-TREB	SUB TREBLE CONTROL	F73	0–7	0	0
AGC-ADJ	AGC LEVEL ADJUST	F74	0–4	0	3
AGC-SW-OFF	NICAM AGC SWICH OFF	F75	0/1	1	1
AGC-GAIN-ADJ	NICAM AGC GAIN ADJUST	F76	0–31	16	16
FM-LEVEL-ADJ	FM LEVEL ADJUST	F77	-15–0–+15	0	0
IGR-LEVEL-ADJ	IGR LEVEL ADJUST	F78	-15–0–+15	+1	+1
NICAM-BG-LVL-ADJ	NICAM B/G LEVEL ADJUST	F79	-15–0–+15	-2	-2
NICAM-I-LVL-ADJ	NICAM I LEVEL ADJUST	F80	-15–0–+15	+3	+3
NICAM-DK-LVL-ADJ	NICAM D/K LEVEL ADJUST	F81	-15–0–+15	-1	-1
NICAM-LOW-ERR-LIM	NICAM LOWER ERROR LIMIT	F82	0–255	35	35
NICAM-UPP-ERR-LIM	NICAM UPPER ERROR LIMIT	F83	0–255	70	70
IGR-GAIN-ADJ	IGR GAIN ADJUST	F84	-6–0–+7	0	0
FM-ID-SPEED	FM SOUND IDENTIFICATION MODE	F85	0–3	1	1
NICAM-AUTO-MUTE	NICAM AUTO DETECTION	F86	0/1	0	0
AUTO-SCM-KIL-AV-YUV	SECAM COLOUR KILLER SENSITIVITY (AV/YUV)	F87	0–3	1	1
AFC1-GAIN-TV	MSB OF HORIZONTAL AFC GAIN1 (TV)	F88	0–3	0	0
AFC1-GAIN-AV	MSB OF HORIZONTAL AFC GAIN1 (AV)	F89	0–3	3	3
AFC1-GAIN-YUV	MSB OF HORIZONTAL AFC GAIN1 (YUV)	F90	0–3	3	3
CON-REDUCE	CONTRAST (PICTURE LEVEL) CONTROL	F91	0–2	0	0
TAKE-OFF-TV	TAKEOFF/BPF OF CHROMA BPFPROCESSING TV	F92	0/1	1	1
TAKE-OFF-AV	TAKEOFF/BPF OF CHROMA BPFPROCESSING AV	F93	0/1	0	0
TAKE-OFF-YUV	TAKEOFF/BPF OF CHROMA BPFPROCESSING YUV	F94	0/1	0	0
C-ANGLE	CHROMA MODULATION ANGLE	F95	0/1	1	1
AC-FALL-WO-BRIGHT	PICTURE BLACK LEVEL (BRIGHT) CONTROL-AC FALLURE	F96	0–255	255	255
FORCED-SCM-KIL-TV	FORCED SECAM COLOUR KILLER SENSITIVITY(TV)	F97	0–3	2	2
FORCED-SCM-KIL-AV-YUV	FORCED SECAM COLOUR KILLER SENSITIVITY(AV/YUV)	F98	0–3	2	2
R-Y ADJ	COLOUR EDGE IMPROVEMENT	F99	0/1	1	1
V-DEMUTE-DELAY	VIDEO DEMUTE DELAY	F100	0–255	0	25
S-DEMUTE-DELAY	SOUND DEMUTE DELAY	F101	0–255	0	40
MER	S-BOOSTER FREQ. CHARACTERISTIC CONTROL	F102	0–255	70	70
MEL1	S-BOOSTER LEVEL1	F103	0–255	150	150
MEL2	S-BOOSTER LEVEL2	F104	0–255	156	156
MEL3	S-BOOSTER LEVEL3	F105	0–255	163	163
MEL4	S-BOOSTER LEVEL4	F106	0–255	165	165
MEL5	S-BOOSTER LEVEL5	F107	0–255	170	170
MEL6	S-BOOSTER LEVEL6	F108	0–255	180	180
S-ST-POINT	S-BOOSTER START POINT	F109	0–60	21	21
S-SP-POINT	S-BOOSTER STOP POINT	F110	0–60	60	60
S-STEP	S-BOOSTER STEP	F111	0–60	7	7
POW-STORAGE	CONTRAST/BRIGHTNESS INCREASE GRADUALLY	F112	0/1	1	1
S-B-BASS	S-BOOSTER BASS LIMITER (WHEN S-BOOSTER ON)	F113	-30–0–+30	+15	+15
S-B-TREB	S-BOOSTER TREBLE LIMITER (WHEN S-BOOSTER ON)	F114	-30–0–+30	+15	+15
S-BASS	S-BOOSTER BASS LIMITER (WHEN S-BOOSTER OFF)	F115	-30–0–+30	+30	+30
S-TREB	S-BOOSTER TREBLE LIMITER (WHEN S-BOOSTER OFF)	F116	-30–0–+30	+30	+30

SETTING MODE (SECOND STAGE)					
EEPROM ITEMS	FUNCTION	OSD	DATA LENGTH	INITIAL DATA	SET UP (DEC)
V-STD-TV		F117	0/1	0	0
V-STD-AV		F118	0/1	0	0
V-STD-YUV		F119	0/1	0	0
WO-BRI-AFT-WO-TIME		F120	0–255	255	255
WO-CONT-AFT-WO-TIME		F121	0–127	127	127
WO-BRI-BEF-WO-TIME		F122	0–255	255	255
WO-CONT-BEF-WO-TIME		F123	0–127	127	127
WO-TIME		F124	0–31	0	0
A2-ID-RESPONSE		F125	0/1	1	1
R-DRI YUV OFFSET		F126	-63–0–+63	0	0
B-DRI YUV OFFSET		F127	-63–0–+63	0	0
R-CUT YUV OFF-SET		F128	-63–0–+63	0	0
G-CUT YUV OFF-SET		F129	-63–0–+63	0	0
B-CUT YUV OFF-SET		F130	-63–0–+63	0	0
CON YUV OFFSET		F131	-63–0–+63	0	+3
BRT YUV OFFSET		F132	-63–0–+63	0	-8
SHP ANT-ONII OFFSET		F133	-31–0–+31	0	0
WAIT MD TIME		F134	0–4	2	2
CONT-OFFSET		F135	-63–0–+63	0	-7
BRI-OFFSET		F136	-63–0–+63	0	-23
CR-PEDESTEL-ADJ		F137	0–15	8	8
CB-PEDESTEL-SDJ		F138	0–15	8	8
SIF-PAL		F139	0/1	0	0
AV2-BRIGHT-OFFSET		F140	-15–0–+15	+7	+7

PRESS MENU (x2) IN SERVICE MODE, LIST BELOW WILL APPEAR

CHECK MODE (THIRD STAGE)

INFO

SVL1	**	***
SVL2	**	***
SVL3	**	***
SVL4	**	***

MICON : ZZ **CHK1 : ACT**
SOFT : 0.79 **CHK2 : NO**

PRESS MENU (x3) IN SERVICE MODE, LIST BELOW WILL APPEAR

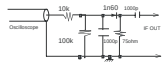
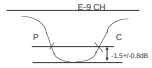
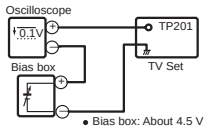
OPTION MODE (FOURTH STAGE)				
EEPROM ITEMS	OSD	DATA LENGTH	INITIAL DATA	SET UP (DEC)
***HOTAL MODE	O01	0/1	0	0
***HTL-POS	O02	0–99	--	--
***HTL-VOL	O03	0–60	--	--
VIF	O04	0/1	1	1
SECAM	O05	0/1	1	0
N443(RF)	O06	0/1	1	0
N358(RF)	O07	0/1	1	0
FORCE-COL	O08	0/1	0	0
S-SYS	O09	1–15	15	1
AV	O10	0/1	1	1
AV2	O11	0/1	1	1
YUV	O12	0/1	1	1
S-CTRL	O13	0/1	1	1
NICAM	O14	0/1	0	0
A2	O15	0/1	0	0
TELETEXT	O16	0/1	0	0
BILLINGUAL	O17	0/1	0	1
LANGUAGE	O18	1–255	63	65
SEARCH-SPEED	O19	1–5	3	3
RIC-MENU	O20	0/1	0	0
LED-CONT	O21	0/1	0	0
S-BOOSTER	O22	0/1	0	0
SHARP-LOGO	O23	0/1	0	0
YUV BKGD ADJ	O24	0/1	0	0
WHITE BACK	O25	0/1	1	0
BOOSTER	O26	0/1	0	0
MESSAGE	O27	0/1	0	0
MESSAGE SCROLL TIME	O28		0	0
LNA TUNER	O29	0/1	0	0
ONE CHIP IC	O30	0/1	0	1

***HOTEL MODE
OPERATION OF HOTEL MODE:
WHEN CHANGE SERVICE DATA O01 TO 1, HOTEL MODE IS ON
WHEN HOTEL MODE IS ON,
1. Max volume data is determined by option setting HTL-VOL (O03)
2. Channel position after POWER ON is determined by option setting HOTEL-POS (O02) (if option setting HOTEL-POS is on set, processing is according to last position data).
3. User data updates of EEPROM regarding the video and audio control is not allowed.
4. Preset mode is disable.
5. CH SETTING menu is not available.

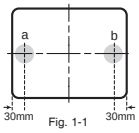
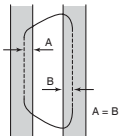
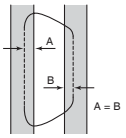
ADJUSTMENT PRECAUTION:

Make sure TV Set is in “Normal Condition” before witch to service mode for adjustment.

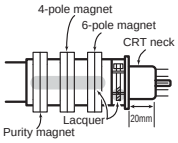
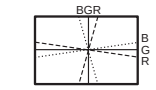
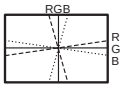
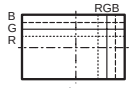
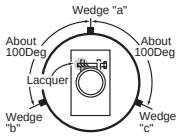
PIF ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**Tuner IFT (PRESET)**	1. Get the tuner ready to receive the CH. - 9 signal, but with no signal input. Adjust the PLL data. 2. Connect the sweep genertor’s output cable to the tuner antenna. (RF SWEEP) 3. Adjust the sweep genertor’s to 80dBμV. 4. Connect the response lead (use LOW IMPEDANCE probe with wave detector. (This terminal must have the probe alone connected). 5 Set the RF AGC to 0 - 6 V with no saturation with the waveform. 6. Adjust the tuner IF coil to obtain the wavefrom as show in Fig. 2. **NOTE: Be sure to keep the tuner cover in position during this adjustment.**	 Fig. 1  Fig. 2
2	**RF-AGC TAKE OVER POINT ADJUSTMENT (I2C BUS CONTROL)** **(AUTO & MANUAL ADJ)**	1. Receive “PAL COLOUR BAR” signal. Signal Strength: 56±1 dBμV (75 ohm open) 2. Connect the oscilloscope to TP201 (Tuner’s AGCTerminal) as show in Fig. 3.  • Bias box: About 4.5 V Fig. 3 3. Call “V01” mode in service mode. Adjust the “V01” bus data to obtain the Tuner output pin drop 0.1~1.0V below maximum voltage. 4. Change the antenna input signal to 63~67dBμV, and make sure there is no noise. 5 Turn up the input signal to 90~95 dBμV to be sure that there is no cross modulation beat.	■ **for Auto ADJ** Receive “PAL COLOUR BAR” signal. Signal strength : 56 ±1 dBμV (75 ohm open) 1. Go to service mode. 2. Go to service data V01, press R/C to operate auto key (Hex C1) and confirm the ‘OK’ display on the screen. 3. If appear NG, increase data some step and pis repeat step2. 4. Preceed step 4&5 in manual mode.

PURITY ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**PURITY ADJ.**	1. Receive the GREEN-ONLY signal. Adjust the beam current to ~700 μA. 2. Degauss the CRT enough with the degauss coil. Note: Follow the Job Instruction Sheet to adjust the magnetic field. Vertical Bv: +0.030 mT (0.30 gauss) Horizontal Bh: +0.20 mT (0.20 gauss) 3. Maintain the purity magnet at the zero magnetic field and keep the static convergence roughly adjusted. 4. Observe the points a, b, as show in Fig. 1-1 through the microscope. Adjust the landings to A rank requirement. 5 Orient the raster rotation to 0 eastward. 6. Tighten up the deflection coil screws. • Tightening torque: 108±20 N (11± 2 kgf) 7. Make sure the CRT corners landing meet the A rank requirements. If not, stick the magnet sheet to correct it. **Note: This adjustment must be done after warming up the unit for 30 minutes or longer with a beam current over 700 μA.** **Note: Set to service mode by remote controller then press factory process R/C RGB key to change to RGB mono colour mode.** * For the following colour press R/C RGB(Hex 7E) key to change. 	 Fig. 1-1  Fig. 1-2 Rank “A” (on the right of the CRT)  Fig. 1-3 Rank “A” (on the left of the CRT) * Press R/C RGB key for 1 second in NORMAL MODE, the colour will change to RGB mono colour mode.

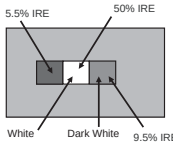
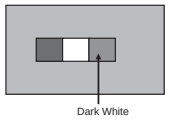
CONVERGENCE ADJUSTMENT

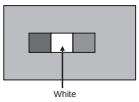
No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**CONVERGENC ADJ. (To be done after the purity adjustment.**	1. Receive the "Crosshatch Pattern" signal. 2. Using the remote controller, call NORMAL mode. **Static convergence** 1. Turn the 4-pole magnet to a proper opening angle in order to superpose the blue and red colours. 2. Turn the 6-pole magnet to a proper opening angle in order to superpose the green colour over the blue and red colours. **Dynamic convergence** 1. Adjust the convergenc on the fringes of the screen in the following steps. a) Fig. a: Driver the wedge at point "a" and swing the deflection coil upward. b) Fig. b: Drive the wedge at point "b" and "c" and swing the deflection coil downmard. c) Fig: c: Drive the the "c" wedge deeper and swing the deflection coil rightward. d) Fig. d: Drive the "b" wedge deeper and swing the deflection coil leftward. 2. Fix all the wedges on the CRT and apply glass tape over them. 3. Apply lacquer to the deflection yoke lock screw, magnet unit (purity, 4-pole, 6-pole magnets) and magnet unit lock screw. Finally received the Red-only and Blue-only signals to make sure there is no other colours on the screen. 	 Fig. a  Fig. b  Fig. c Fig. d 

H-VCO, VIF-VCO & S-TRAP for ADJUSTMENT

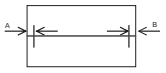
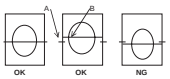
No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**H-VCO ADJ (I2C BUS CONTROL) (AUTO & MANUAL ADJ)**	**(MANUAL ADJ)** 1. In No signal (RASTER) condition. 2. Go to service mode, choose service data V03. 3. Connect oscilloscope to IC801 pin11, adj V03 until freq become 15.625±0.15 KHz **(AUTO ADJ)** 1. In No signal (RASTER) condition. 2. Go to service mode. 3. Choose service data V03, by pressing R/C Auto (Hex C1) key, OSD will appear "OK" at screen. 4. If appear "NG" pls repeat step 3.	
2	**VIF-VCO ADJ (I2C BUS CONTROL) (AUTO & MANUAL ADJ)**	**(MANUAL ADJ)** 1. In No signal (RASTER) condition. 2. Go to service mode, choose service data V02. 3. Connect oscilloscope to IC801 pin2, adj V02 until voltage become 2.5±1V. **(AUTO ADJ)** 1. In No signal (RASTER) condition. 2. Go to service mode, choose service data V02. 3. Press the R/C Auto (Hex C1) key, OSD will appear "OK" at screen. 4. If appear "NG" pls repeat step 3.	This adjustment must be done after aging at least 3 minutes.
3	**S-TRAP fo ADJ (I2C BUS CONTROL) (AUTO & MANUAL ADJ)**	**(Manual ADJ)** 1. In No signal (RASTER) condition. 2. Go to service mode, choose service data V21. 3. Connect oscilloscope to TP 801, adj V21 until voltage become Min (below 5 V). 4. After that pls adj service data V20 & V24 same as "V21", V22 to "V21-1", V23 to V21+2". **(Auto Adj)** 1. In No signal (RASTER) condition. 2. Go to service mode, choose service data V21. 3. Press the R/C Auto (Hex C1) key, OSD will appear "OK" at screen. 4. If appear "NG" pls repeat step 3.	

SCREEN, WHITE BALANCE, SUB-BRIGHTNESS & SUB-CONTRST ADJUSTMENT

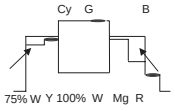
No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**SCREEN ADJUSTMENT (I2C BUS CONTROL)**	1. In window pattern signal condition. 2. Go to service mode, then select V00. 3. By pressing R/C key S-Mute (Hex E8), R-D auto switch to 63, B-D auto switch to 63, R-C auto switch to 127, G-C auto switch to 127, B-C auto switch to 127, Sub-brightness V06 auto switch to 127. Y-mute & Vertical off, screen will be invertical cut-off condition. 4. Adjust the Screen so that cut-off line appear in low bright, then judge that whether the cut-off the appear in Red or Green or Blue color, in this condition between R-C & G-C & B-C, fix the data of the color appear in cut-off line and adj the other two cut-off data (Note 1) so that cut-off line color become white. 5. Turn the screen VR of FBT so that cut-off line just disappear and use R/C by pressing key S-Mute (Hex E8) to disable the Y-mute & V-cut so that picture appear in normal mode.	R-CUTOFF (R-C)UP RC key "1" (HEX 80) R-CUTOFF (R-C)DOWN RC key "4" (HEX 20) G-CUTOFF (G-C)UP RC key "2" (HEX 40) G-CUTOFF (G-C)DOWN RC key "5" (HEX A0) B-CUTOFF (B-C)UP RC key "3" (HEX C0) B-CUTOFF (B-C)DOWN RC key "6" (HEX 60) R-DRIVE (R-D)UP RC key "7" (HEX E0) R-DRIVE (R-D)DOWN RC key "Flashback" (HEX E4) B-DRIVE (B-D)UP RC key "8" (HEX 10) B-DRIVE (B-D)DOWN RC key "0" (HEX 50)
2	**WHITE BALANCE ADJ (to be done after screen adj) (I2C BUS CONTROL)**	**1. WHITE (HIGHT BEAM)** (In Window Pattern Signal) First use Minolta Color Analyzer CA100, let the gun point at Dark White position (as drawing attach), Adj V06 until LUMINANCE Y become 5 cd/m2, then let the gun point at White position (as drawing attach), Adj V04 until LUMINANCE Y become: 200 cd/m2. Adj the R-D & B-D until the axis of color temperature become X=300, Y=310 7500K **2. DARK WHITE (LOW BEAM)** (In Window Pattern Signal) Let the gun point at Dark White position, if the color temperature data shift away from the data adjusted in step 1, adjust R-C, G-C & B-C but between them, first color appears in screen adj item 1) -4 is fixed, adj the other two so that to obtain the similar axis as above **** Repeat step 1 & 2 to get a regulated position.**	 ***Note: SignalusingW/B Pattern Generator SX-1006 (IWATSU) or equivalent. Window Pattern Signal outputlevel are asabove:**
3.	**SUB-BRIGHTNESS (to be done after screen, white balance adj) (I2C BUS CONTROL)**	1. In Window Pattern Signal condition. 2. Using Minolta Color Analyzer CA-100, let the gun point at Dark White position (as attach drawing), adjust V06 Bus data until LUMINANCE Y = 3 ± 0.5 cd/m2.	WINDOW PATTERN SIGNAL 

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
4	**SUB-CONTRAST (to be done after screen, white balance adj, sub-brightness adj) (I2C BUS CONTROL)**	1. In Window Pattern Signal condition. 2. Using Minolta Color Analyzer CA-100, let the gun point at White position (as attach drawing), adjust V04 Bus data until LUMINANCE Y= 200 ±10cd/m2.	WINDOW PATTERN SIGNAL 
5	**Beam Current Check**	1. Recive the "Monoscope Pattern" signal. 2. Press R/C to set Picture Normal condition. 3. Connect the DC miliammeter between TP 603 (+) & TP 602 (-). (Full Scale: 3mA Range) 4. Beam current must be within 1000 ±100 μA.	

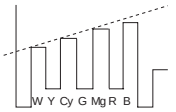
HORIZONTAL, VERTICAL, DEFLECTION LOOP and FOCUS ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**H-SHIFT (I2C BUS CONTROL) (to be done after purity adj)**	1. Receive Monoscope Pattern Signal (PAL 50 Hz) 2. Choose the service data V13. 3. Adjust the V13 bus data to have a balance position to spec of A=B (as attach drawing) 4 If cannot make it to A=B, adjust from the best point so that b slightly smaller than A.	
2.	**V-SHIFT (I2C BUS CONTROL) (to be done after purity adj)**	1. Recceive Monoscope Pattern Signal (PAL 50 Hz) 2. Choose the service data V12. 3. Adjust V12 bus data to have a most acceptable vertical position, the monoscope pattern should be Balance in vertical position. **Note: B line (Monoscope middle line) must same or nearest higher position to the A mark (Tube middle mark), refer to the attach drawing.**	Figure: 
3.	**V-SIZE (I2C BUS CONTROL) (to be done after purity, V-shift adj)**	1. Receive Monoscope Pattern Signal (PAL 50 Hz) 2. Choose the service data V11. 3. Adjust V11 bus data until the overscan become 10±1.5% **Caution1: Pls aging TV more than 10 minutes before adjustment.** **Caution2: for H-shift & V-shift & V-size adj, after adj pls switch to Monoscope pattern signal (NTSC 60 Hz) to confirm all position are the same.**	
4.	**SUB-SHARPNESS**	1. Confirm Service data V08 is 43.	
5.	**Focus**	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Adjust the focus control to get the best focusing.	

PAL CHROMA ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**SUB-COLOUR (I2C BUS CONTROL) (to be done after sub-picture, sub tint adj)**	1. Recive the "PAL Colour Bar " signal 2. Press R/C to set Picture Normal condition. 3. Connect the osilloscope to R-Amp Transistor Base (TP851). • Range :100mV/Div(AC) (User Probe10:1) • Sweep Time : 10 µsec/Div. 4. Using the R/C call V05 in Service mode. Adjust V05 bus data, so that the 75% White & Red portions of PAL Colour Bar be at the same level shown as Fig 1-1. 5. Clear the Service mode.	 Fig. 1-1

NTSC CHROMA ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**SUB-TINT (I2C BUS CONTROL)**	1. Recive the "NTSC3.58 Colour Bar " signal thru AV in. 2. Connect the osilloscope to B-Amp Transistor Base (TP853). • Range :100mV/Div(AC) (User Probe10:1) • Sweep Time : 10 µsec/Div. 3. In Service mode, go to V07, press R/C Y- mute (Hex E4) or FLASHBACK Key. 4. Call the "V07" data in service mode. Adjust the "V07" bus data to obtain the waveformshown as Fig. 1-1. 5. Disable Y-Mute by pressing key(Hex E4) or FLASHBACK, then clear the SERVICE mode.	 Fig. 1-1

PROTECTOR OPERATION CHECKING

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**BEAM PROTECTOR**	1. Receive "Monoscope Pattern" signal. 2. Set CONTRAST MAX. 3. Set BRIGHT MAX. 4. During the Collector & Emitter of Q853/4/5 short, make sure the protector ON and switch to standby mode.	*Select one of Q853/4/5 to do each short.
2	**H, V PROTECTOR**	1. Receive "Monoscope Pattern" signal. 2. Connect output of Bias Box to D602 cathode (C602 positive). 3. Set voltage of Bias Box to 18V and make sure the protector is not working. 4. Set voltage of Bias Box to 27V, and make sure the protector is working.	
3	**OTHER PROTECTOR**	1. Once finish rectified Electrolytic Capacitor short testing in +B line, check all possible damaged components on +B line. (Use random selected set for inspection)	

A/V INPUT, OUTPUT & COMPONENT IN CHECKING

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**VIDEO AND AUDIO OUTPUT CHECK**	1. Receive the "PAL Colour Bar" signal (100%White Colour Bar, Sound 400Hz 100% Mod.) 2. Terminate the Video output with a 75 ohm impedance. Make sure the output is as specified (1.0 Vp-p ± 3dB). 3. Terminate the Audio output with a 10K ohm impedance. Make sure the O/P is as specified (1.5 Vp-p ± 3dB).	
2	**VIDEO AND AUDIO INPUT CHECK**	1. Using the TV/VIDEO key on the remote controller, make sure that the modes change in order of TV, AV1, AV2 & TV again and the video & audio output are according to the input terminal for each mode.	
		1. Using the TV/AV key on the remote controller, make sure that the modes change in order of TV, AV & TV again and the video & audio output are according to the input terminal for each mode. If connect input to front and rear AV terminal, input terminal of front AV will be selected.	
3	**COMPONENT IN CHECK**	1. Connect YUV & Audio signal to Component In terminal and Audio terminal. 2. Using the TV/VEDIO key on the remote controller, press it until the modes change to COMPONENT, confirm output is appear.	

FUNCTION OPERATION CHECKING (VIDEO AND AUDIO)

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**CONTRAST key**	1. Receive "Monoscope Pattern" signal. 2. Set MENU, then go into PICTURE mode to select CONTRAST. 3. Press Volume UP/Down key to check whether the CONTRAST effect is OK or not.	
2	**COLOUR key**	1. Receive "Colour Bar" signal. 2. Set MENU, then go into PICTURE mode to select COLOUR. 3. Press Volume UP/Down key to check whether the COLOUR effect is OK or not.	
3	**BRIGHTNESS key**	1. Receive "Monoscope Pattern" signal. 2. Set MENU, then go into PICTURE mode to select BRIGHTNESS. 3. Press Volume UP/Down key to check whether the BRIGHTNESS effect is OK or not.	
4	**TINT key**	1. Receive "NTSC Colour Bar" signal thru AV in. 2. Set MENU, then go into PICTURE mode to select TINT. 3. Press Volume UP/Down key to check TINT, UP for GREEN direction and DOWN for PURPLE direction whether is OK or not.	
5	**SHARPNESS key**	1. Receive "Monoscope Pattern" signal. 2. Set MENU, then go into PICTURE mode to select SHARPNESS. 3. Press Volume UP/Down key to check whether the SHARPNESS effect is OK or not.	

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
6	**CH DISPLAY COLOUR**	1. All Ch (1~99) will have an OSD display of the channel number in green colour under AFT ON ondition.	
7	**NORMAL key**	1. Once in PICTURE or SOUND Mode, and the NORMAL key is pressed, all the settings will be preset to normal setting accordingly. (Normal setting value for every mode) **PICTURE MENU** / **SOUND MENU** CONTRAST : MAX — SURROUND : OFF COLOUR : CENTER — TREBLE : CENTER BRIGHTNESS : CENTER — BASS : CENTER TINT : CENTER — BALANCE : CENTER SHARPNESS : CENTER WHITE TEMP : CENTER	In NORMAL Mode, when press NORMAL key, will appear NORMAL OSD and all setting PICTURE, SOUND functions set to NORMAL.
8	**WHITE TEMP**	1. Receive “Monoscope Pattern” signal. 2. Set MENU, then go into PICTURE mode to select WHITE TEMP. 3. Press Volume Up/Down key to check WHITE TEMP function The back ground will change to (shift right) bluish and (shift left) reddish.	
9	**COLOUR SYSTEM**	1. Receive the “PAL COLOUR BAR” signal, press MENU, choose CH-SETTING to select COLOUR mode except PAL, check the COLOUR is not working properly. Then, sclect the “PAL” mode. Check again its colour so that it is working properly. 2. Receive “NTSC 3.58/4.43 COLOUR BAR” signal thru AV, press MENU, choose CH-SETTING to select COLOUR modes except N3.58/4.43, check the COLOUR is not working properly.Then, select the N3.58/4.43 mode. Check again its colour so that it is working properly.	
10	**SURROUND**	1. Receive “music” sound signal. 2. Set MENU, then go into SOUND MENU to select SURROUND. 3. Press Volume UP/DOWN key to check SURROUND I, II and OFF effect.	
11	**TREBLE**	1. Receive “music” sound signal. 2. Set MENU, then go into SOUND MENU to select TREBLE. 3. Press Volume UP/DOWN key to check whether the TREBLE effect is OK or not.	
12	**BASS**	1. Receive “music” sound signal. 2. Set MENU, then go into SOUND MENU to select BASS. 3. Press Volume UP/DOWN key to check whether the BASS effect is OK or not.	
13	**BALANCE**	1. Receive mono-tone signal. 2. Set MENU, then go into SOUND MENU to select BALANCE. 3. Press Volume UP/DOWN key to check whether the left to right BALANCE effect is OK or not.	

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
14	**SOUND SYSTEM**	1. Receive “PAL-B/G” signal, press MENU, choose 2. CH-SETTING to make sure there is NO sound system selection and check the sound output is working properly.	
15	**NOISE MUTE CHECKING**	1. Receive “PAL COLOUR BAR” signal. 2. Turn UP the volume control to maximum, make sure the sound is head from the speakers. Turn put the until in no signal state. 3. Check the sound mute is effective. 4. Finally turn sound level of CTV to minimum.	
16	**OSD LANGUAGE QUANTITY CHECK**	1. Check OSD LANGUAGE quantity and type for respect model. QUANTITY: 2 — ENGLISH: O — THAI: O	

HEADPHONE JACK CHECKING

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**HEADPHONE OUTPUT CHECKING**	1. Receive PAL COLOUR BAR with SOUND 400Hz, 100% MODULATION (±50KHz Dev). 2. Maximum volume, and ckeck the headphone output with 400Hz sound and no sound output from speaker.	

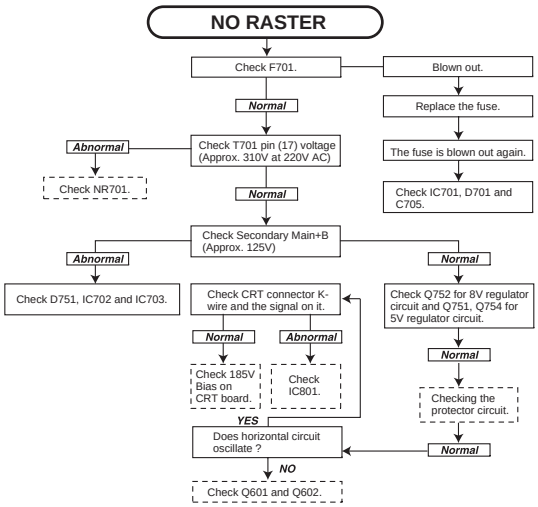
SHOCK TEST CHECKING

No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**SHOCK TEST**	1. Hit at the top of TV set for two time. 2. Check TV set not damage and TV operation operate correctly.	

BILINGUAL CHECKING

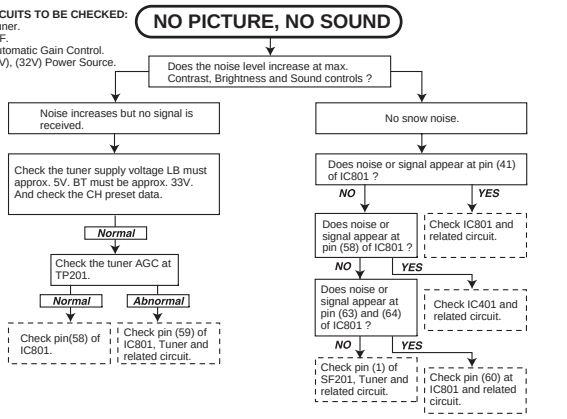
No.	Adjusting point	Adjusting procedure/conditions	Wavefrom and others
1	**BILINGUAL FUNCTION CHECKING**	1. Receive bilingual channel. 2. Press R/C “MPX” button, and the sound will change SOUND1 to SOUND2.	

TROUBLE SHOOTING FLOWCHART

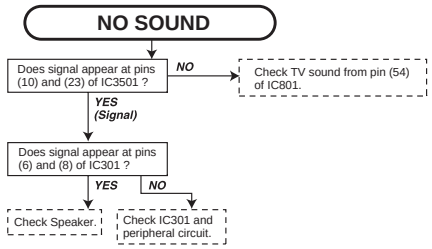


TROUBLE SHOOTING FLOWCHAT (Continued)

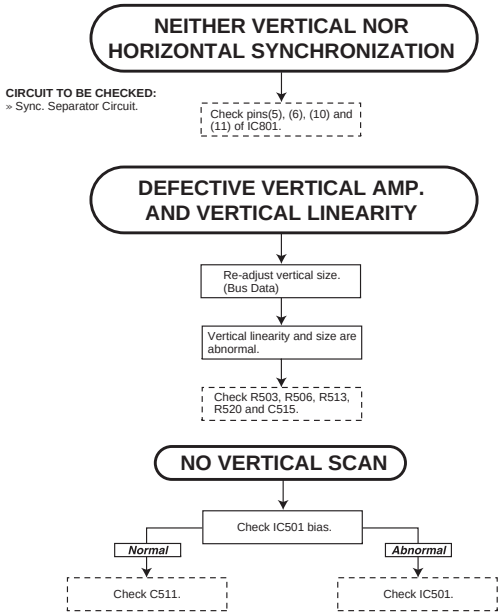
CIRCUITS TO BE CHECKED:
» Tuner.
» PIF.
» Automatic Gain Control.
» (5V), (32V) Power Source.


NO PICTURE, NO SOUND
Does the noise level increase at max. Contrast, Brightness and Sound controls ?
Noise increases but no signal is received.
No snow noise.
Check the tuner supply voltage LB must approx. 5V. BT must be approx. 33V. And check the CH preset data.
Does noise or signal appear at pin (41) of IC801 ?
NO
YES
Normal
Does noise or signal appear at pin (58) of IC801 ?
Check IC801 and related circuit.
Check the tuner AGC at TP201.
NO
YES
Does noise or signal appear at pin (63) and (64) of IC801 ?
Check IC401 and related circuit.
Normal
Abnormal
NO
YES
Check pin(58) of IC801.
Check pin (59) of IC801, Tuner and related circuit.
Check pin (1) of SF201, Tuner and related circuit.
Check pin (60) at IC801 and related circuit.

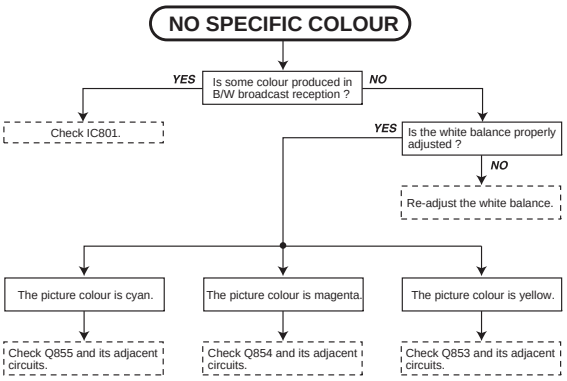
CIRCUITS TO BE CHECKED:
» Sound Detector Circuit.
» Sound Switch and Att. Control.
» Audio Output Circuit.


NO SOUND
Does signal appear at pins (10) and (23) of IC3501 ?
NO
Check TV sound from pin (54) of IC801.
YES (Signal)
Does signal appear at pins (6) and (8) of IC301 ?
YES
NO
Check Speaker.
Check IC301 and peripheral circuit.

TROUBLE SHOOTING FLOWCHART (Continued)

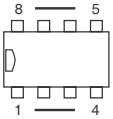

NEITHER VERTICAL NOR HORIZONTAL SYNCHRONIZATION
CIRCUIT TO BE CHECKED:
» Sync. Separator Circuit.
Check pins(5), (6), (10) and (11) of IC801.
DEFECTIVE VERTICAL AMP. AND VERTICAL LINEARITY
Re-adjust vertical size. (Bus Data)
Vertical linearity and size are abnormal.
Check R503, R506, R513, R520 and C515.
NO VERTICAL SCAN
Check IC501 bias.
Normal
Abnormal
Check C511.
Check IC501.

TROUBLE SHOOTING FLOWCHART (Continued)


NO SPECIFIC COLOUR
YES
Is some colour produced in B/W broadcast reception ?
NO
Check IC801.
YES
Is the white balance properly adjusted ?
NO
Re-adjust the white balance.
The picture colour is cyan.
The picture colour is magenta.
The picture colour is yellow.
Check Q855 and its adjacent circuits.
Check Q854 and its adjacent circuits.
Check Q853 and its adjacent circuits.

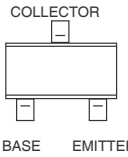
SOLID STATE DEVICE BASE DIAGRAM

TOP VIEW

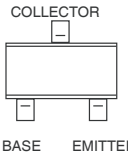


AT24W08

FXA003WJ



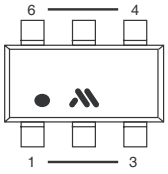
C3928



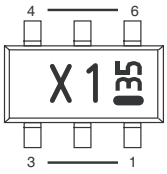
A1530

EX1393C

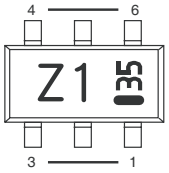
EX0263T



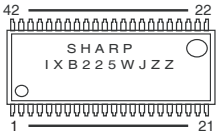
M1501XN



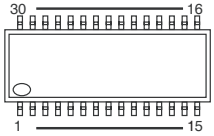
IMX1C/C



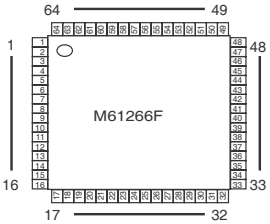
IMZ1A



IXB225W

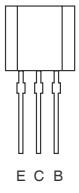


NJW1142

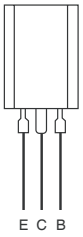


M61266F

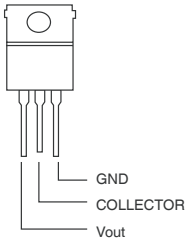
SIDE VIEW



2SC3198

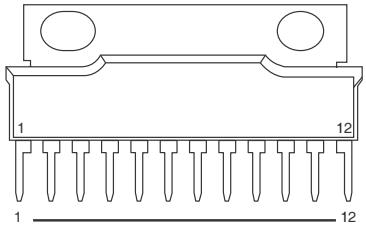


2SD468-C
2SC2235



SE125N

TT2140



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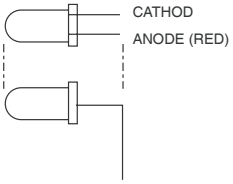

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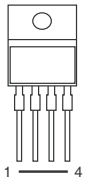

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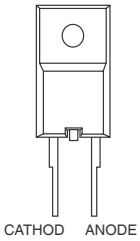

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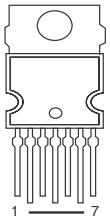

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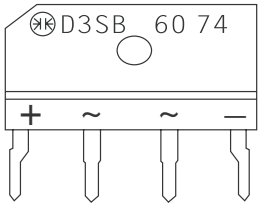

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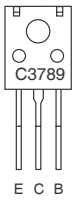

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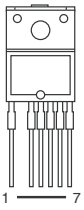
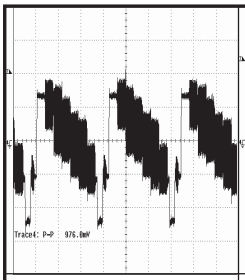
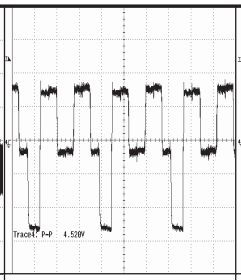
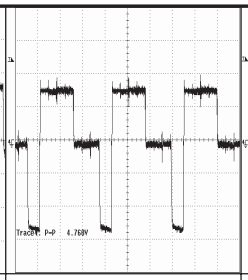
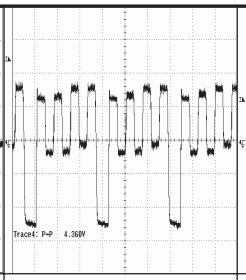
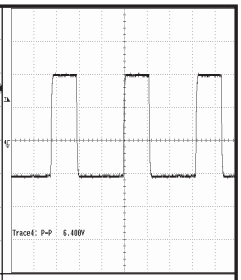
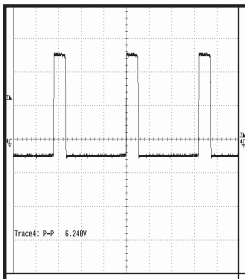
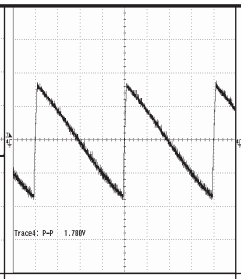
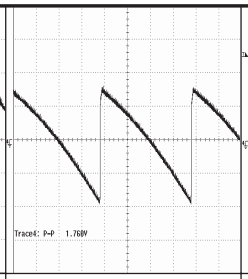
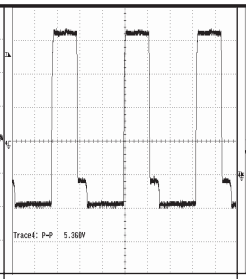
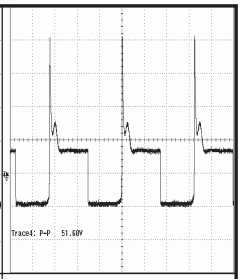
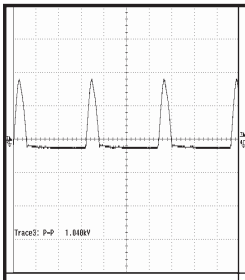
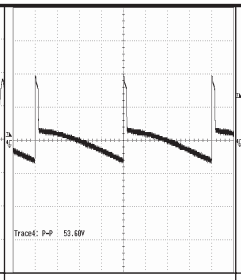
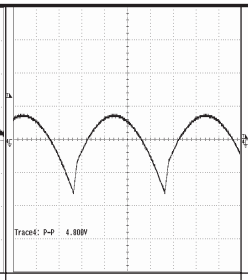
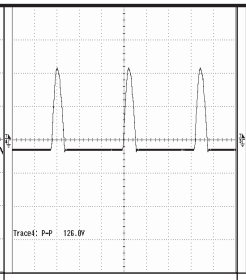
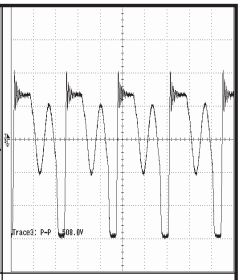
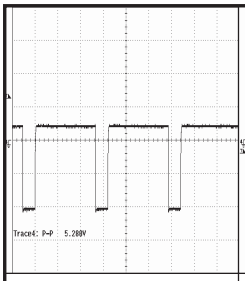
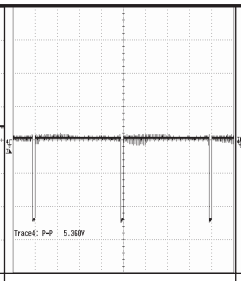
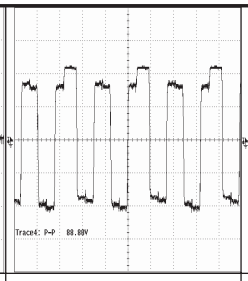
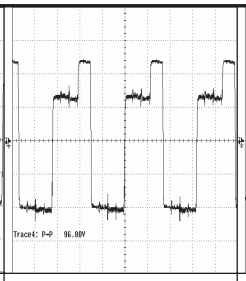
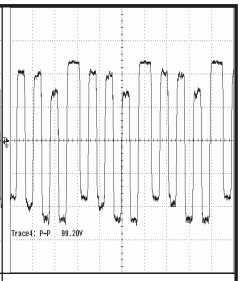
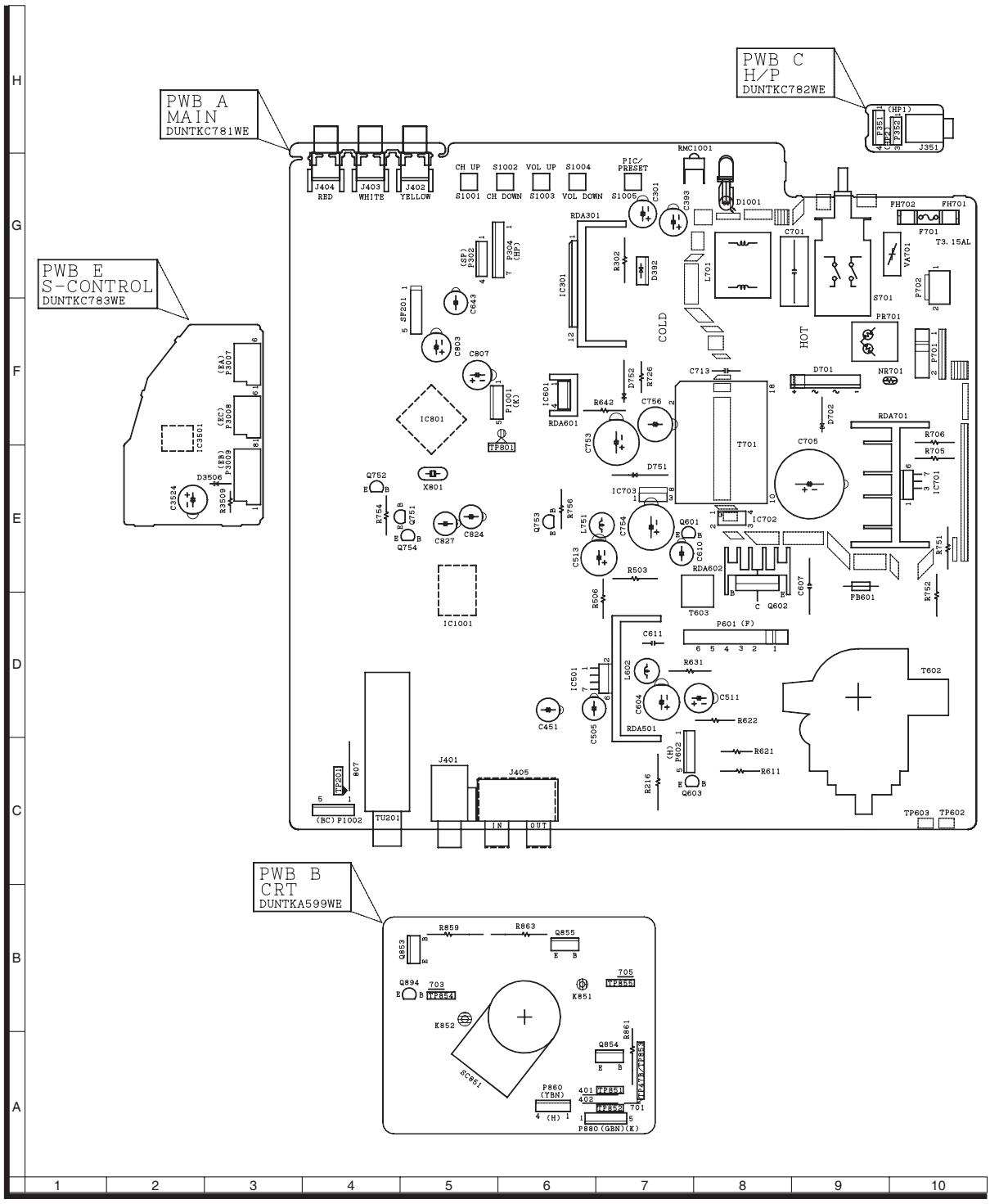


STRW6753

WAVE FROMS

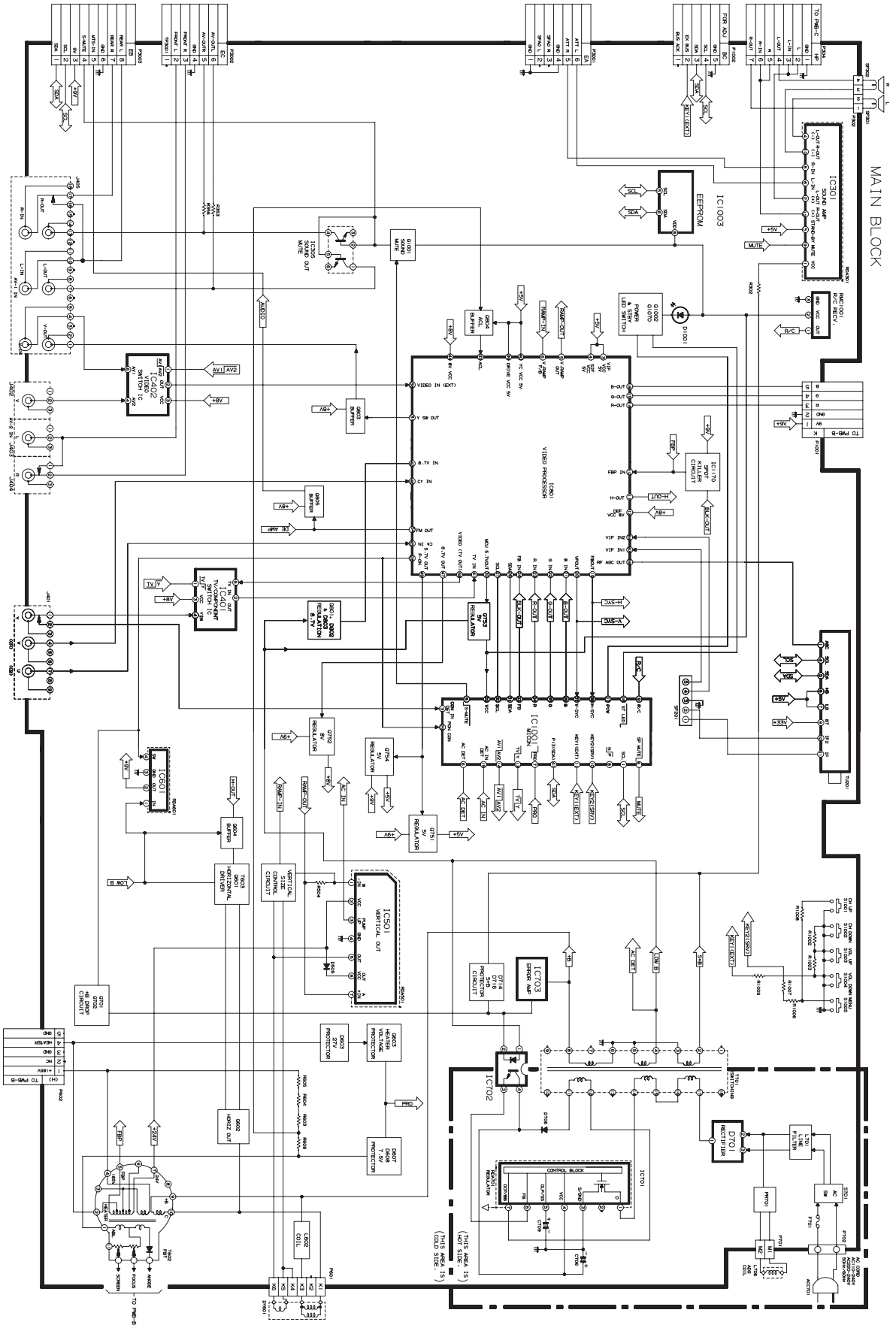
				
1) 0.976 Vp-p Horiz. Rate	2) 4.520 Vp-p Horiz. Rate	3) 4.760 Vp-p Horiz. Rate	4) 4.360 Vp-p Horiz. Rate	5) 6.12 Vp-p Horiz. Rate
				
6) 6.24 Vp-p Horiz. Rate	7) 1.80 Vp-p Vert. Rate	8) 1.76 Vp-p Vert. Rate	9) 5.63 Vp-p Horiz. Rate	10) 51.6 Vp-p Horiz. Rate
				
11) 1040 Vp-p Horiz. Rate	12) 53.6 Vp-p Vert. Rate	13) 4.8 Vp-p Vert. Rate	14) 126 Vp-p Horiz. Rate	15) 508 Vp-p
				
16) 5.28 Vp-p Horiz. Rate	17) 5.36 Vp-p Vert. Rate	18) 88.8 Vp-p Horiz. Rate	19) 96.8 Vp-p Horiz. Rate	20) 99.2 Vp-p Horiz. Rate

CHASSIS LAYOUT

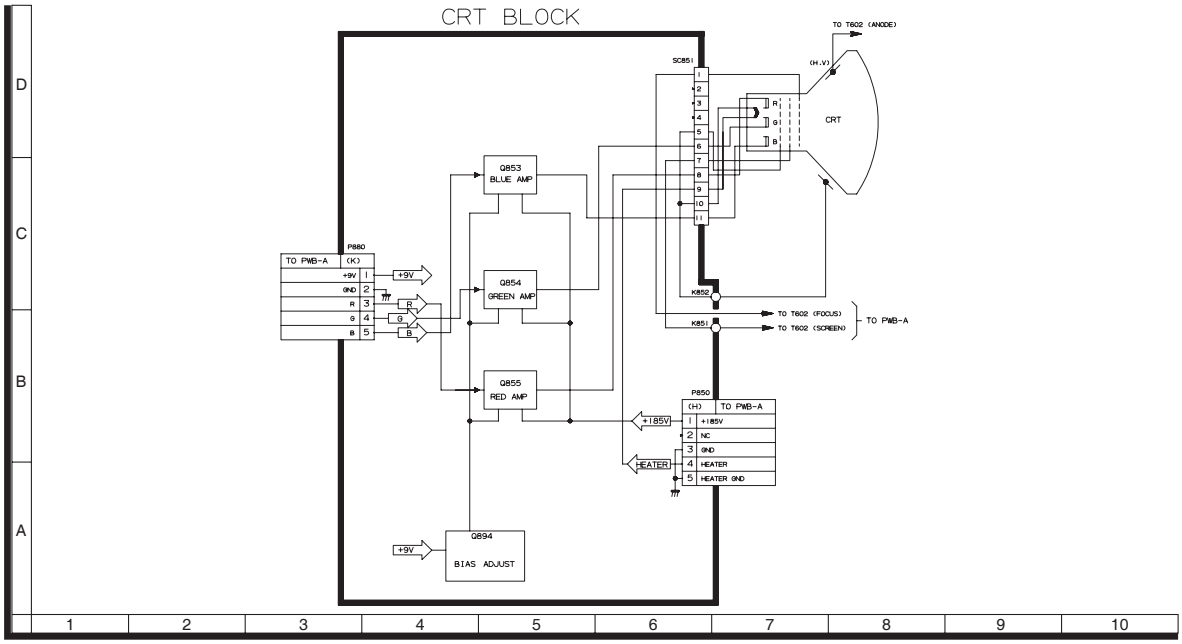


BLOCK DIAGRAM

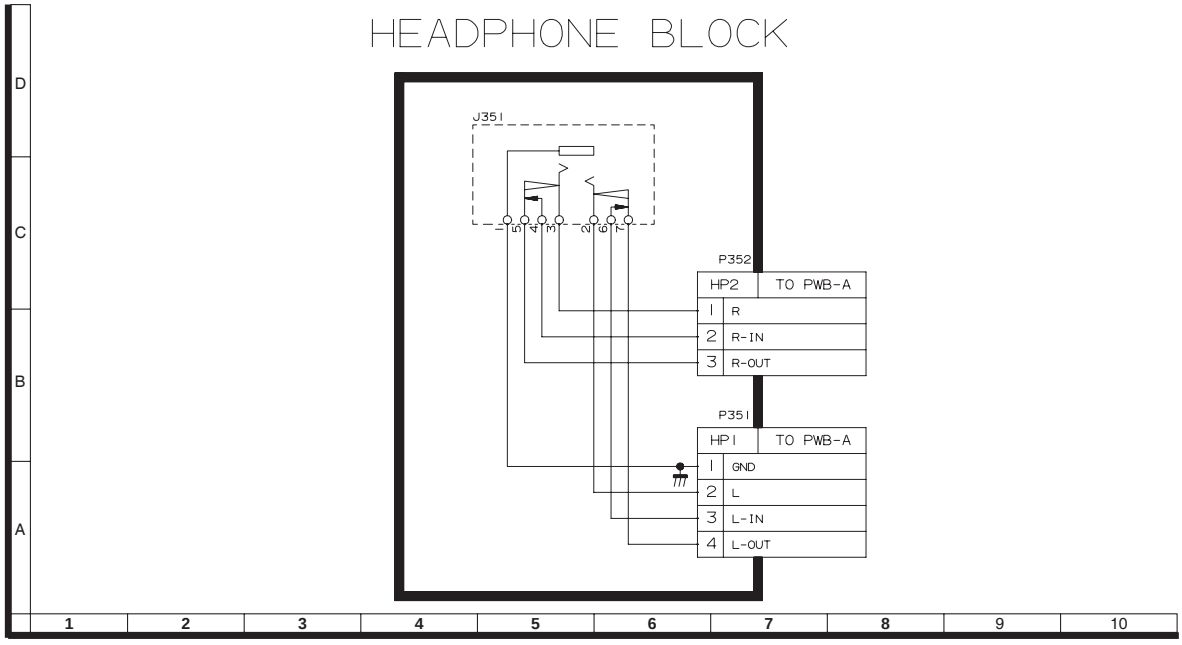
PWB A : MAIN UNIT



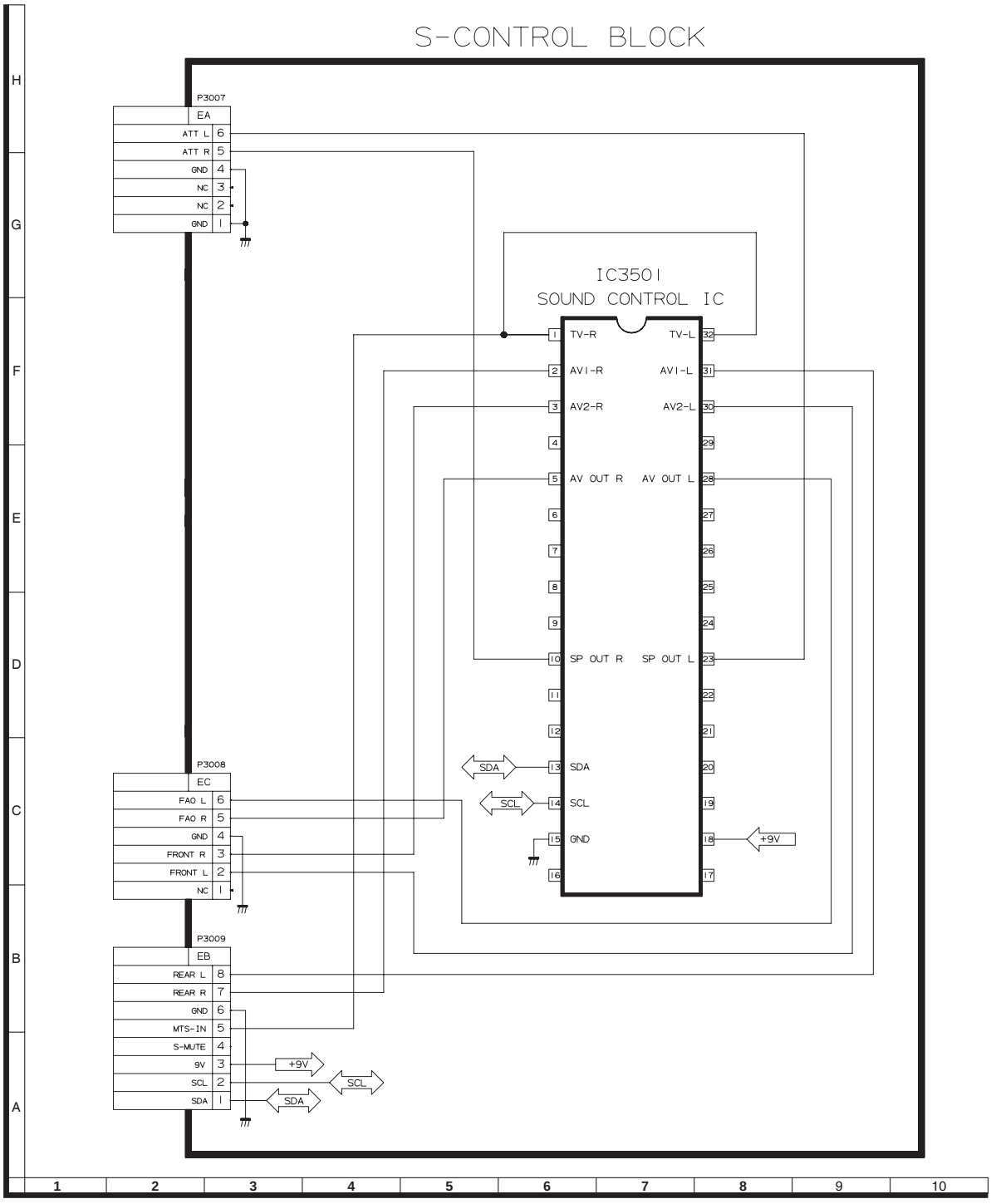
PWB B : CRT UNIT



PWB C : HEADPHONE UNIT



PWB E : SOUND CONTROL UNIT



DESCRIPTION OF SCHEMATIC DIAGRAM

SAFETY NOTE :

1. *DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.*
2. *SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.*

IMPORTANT SAFETY NOTICE :

PARTS MARKED WITH "⚠"( ) ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET. BE SURE TO REPLACE THESE PARTS WITH SPECIFIED ONES FOR MAINTAINING THE SAFETY AND PERFORMANCE OF THE SET.

SERVICE PRECAUTION :

THE AREA ENCLOSED BY THIS LINE (——–——) IS DIRECTLY CONNECTED WITH AC MAINS VOLTAGE. WHEN SERVICING THE AREA, CONNECT AN ISOLATING TRANSFORMER BETWEEN TV RECEIVER AND AC LINE TO ELIMINATE HAZARD OF ELECTRIC SHOCK.

NOTE :

1. *The unit of resistance "ohm" is omitted. (K = 1000 ohm, M = Mage ohm).*
2. *All resistors are 1/16 watts, unless otherwise noted.*
3. *All capacitor are μF, unless otherwise noted. (P = μμF).*

VOLTAGE MEASUREMENT CONDITIONS :

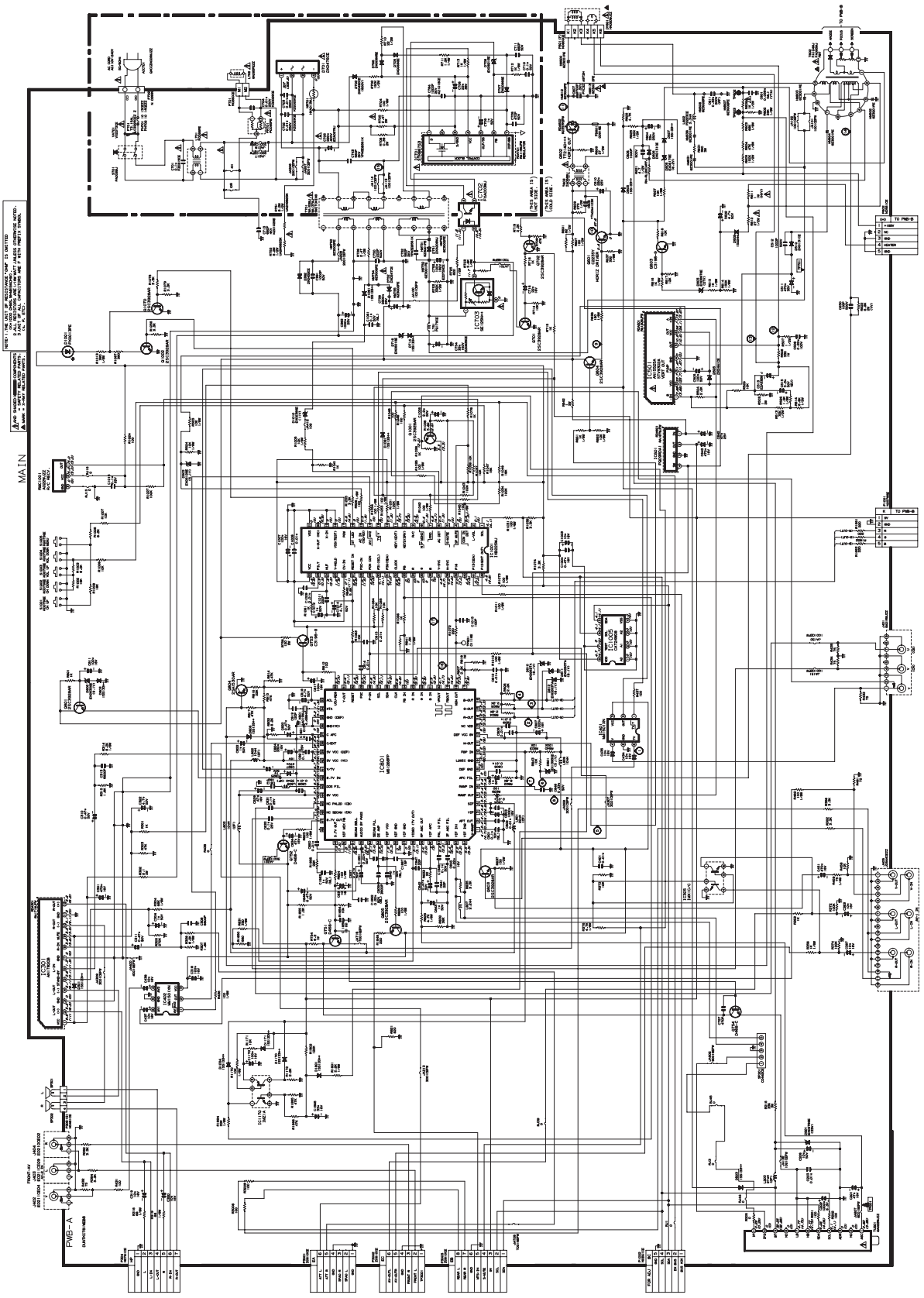
1. *Voltages in parenthesis measured with no signal.*
2. *Voltage without parenthesis measured with 3mV B & W or colour signal.*
3. *All the voltages in each point are measured with VTVM.*

WAVE FORM MEASUREMENT CONDITIONS :

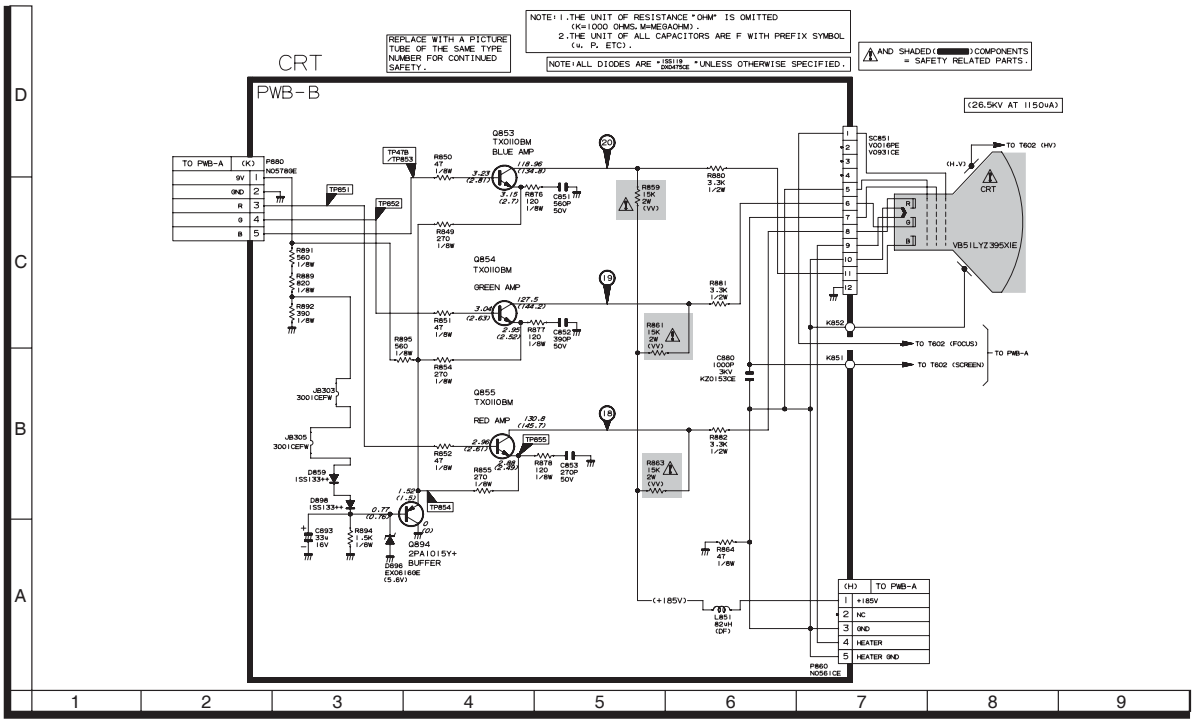
1. *The colour bar generator signal of 1.0V peak applied at pin (41) of IC801.*
2. *Approximately 4V AGC bias.*

SCHEMATIC DIAGRAM

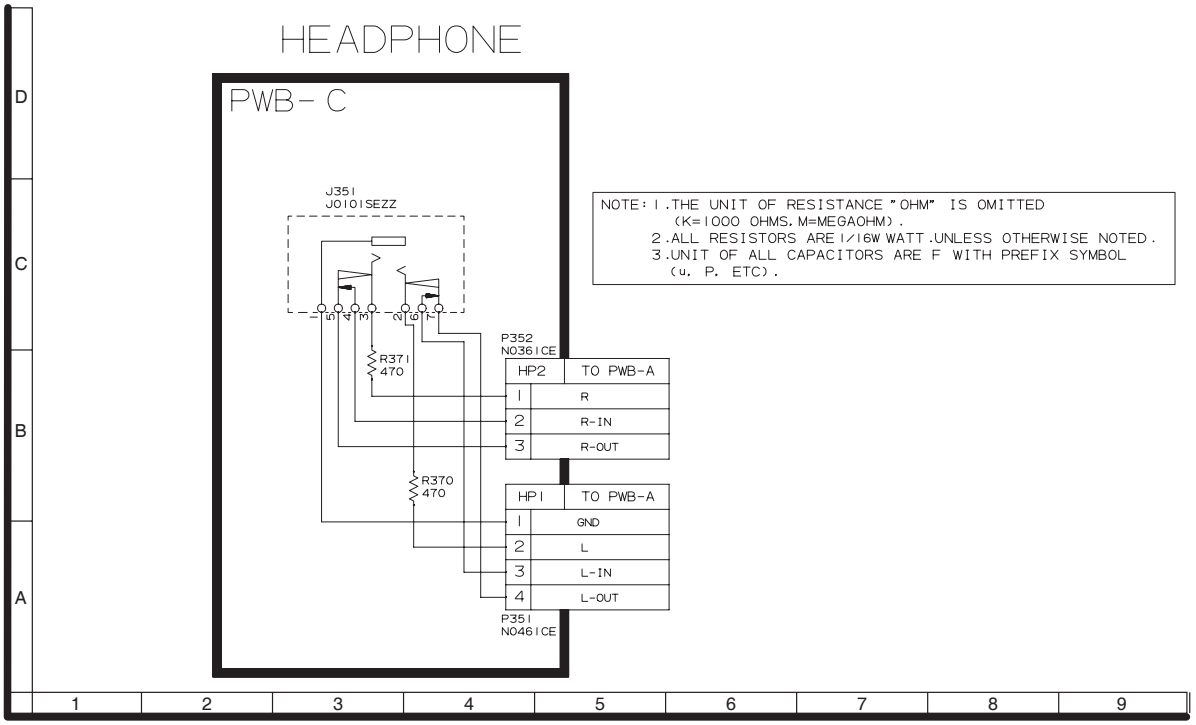
PWB A : MAIN UNIT



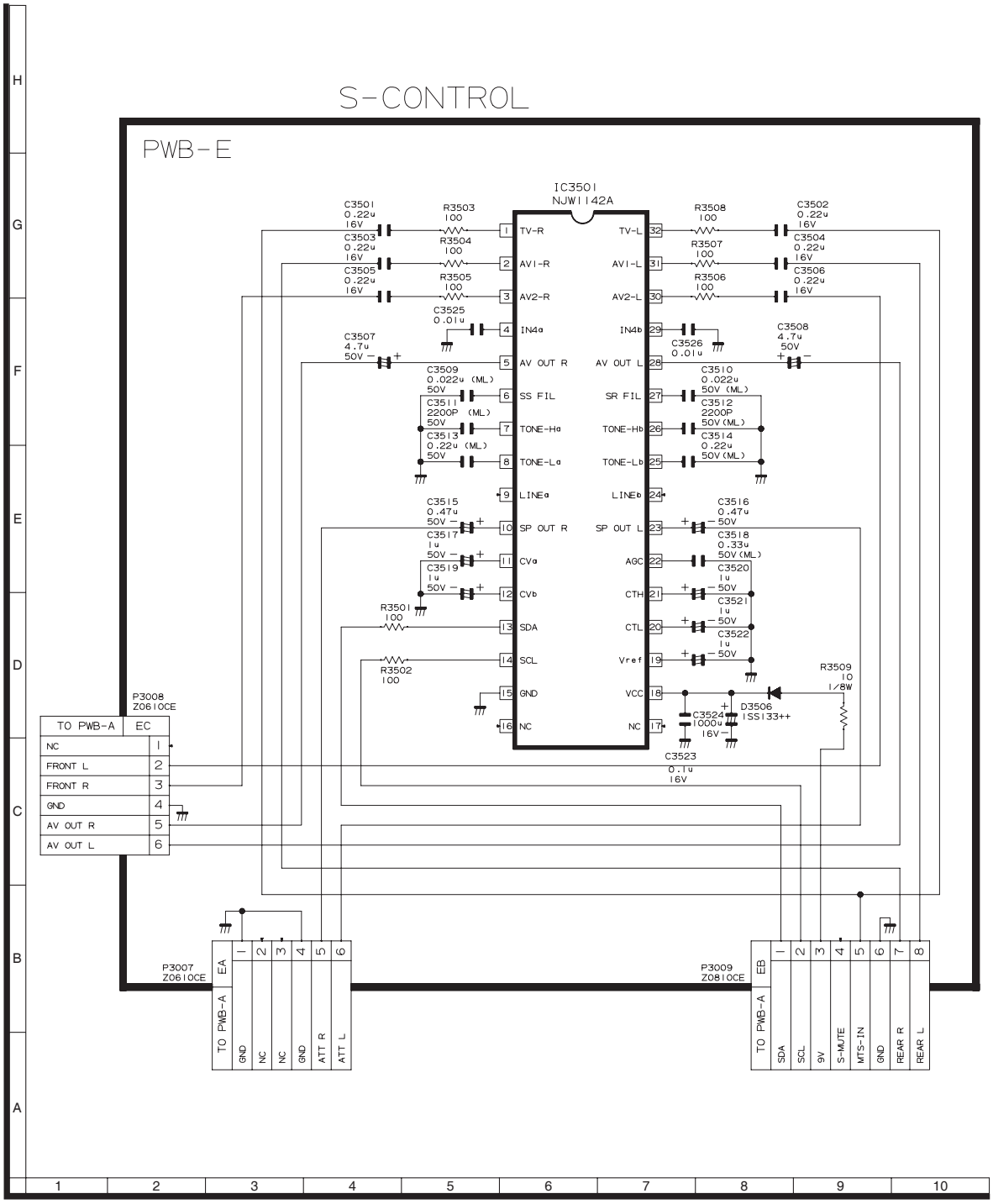
PWB B : CRT UNIT



PWB C : HEADPHONE UNIT

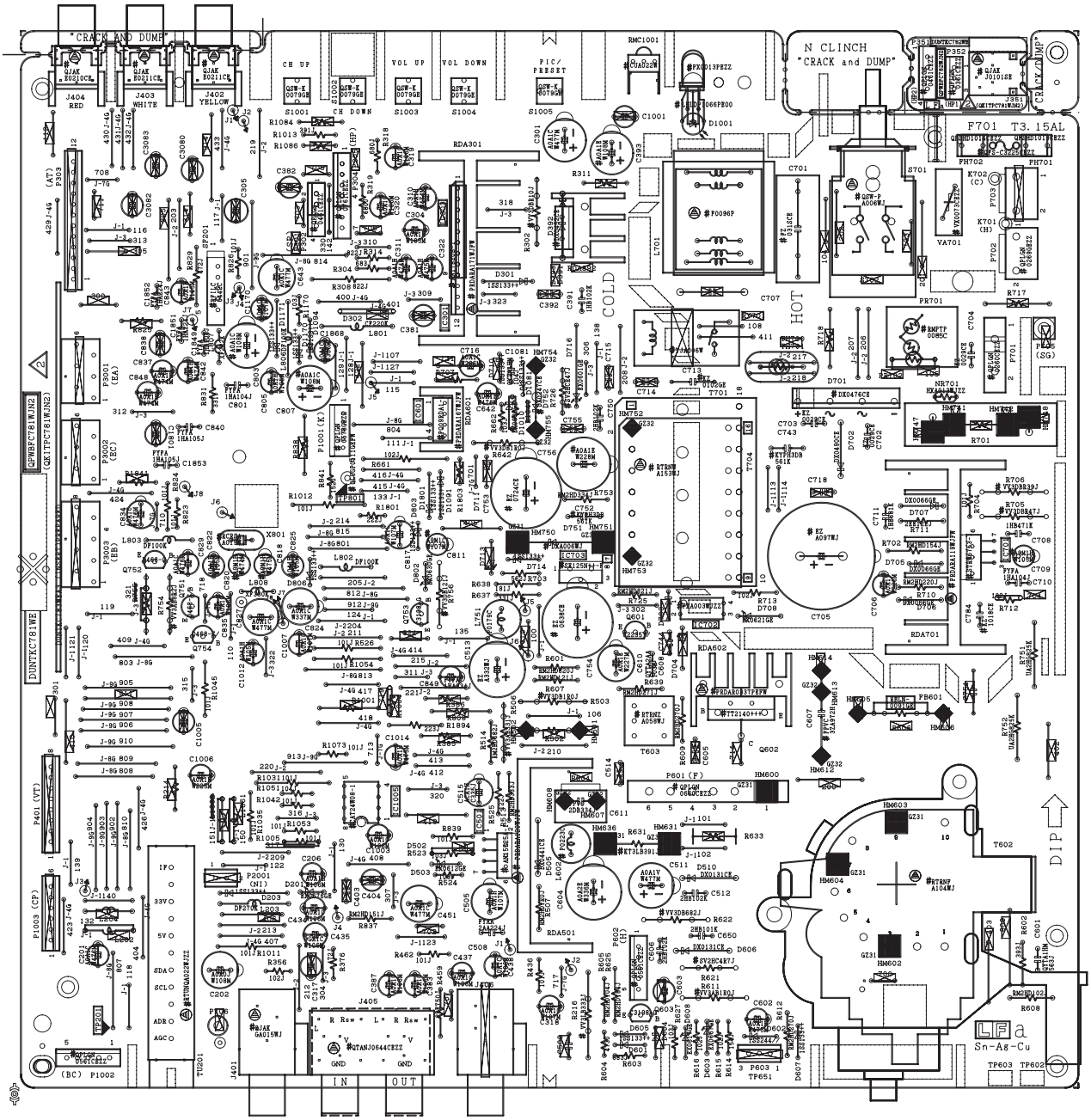


PWB E : SOUND CONTROL UNIT

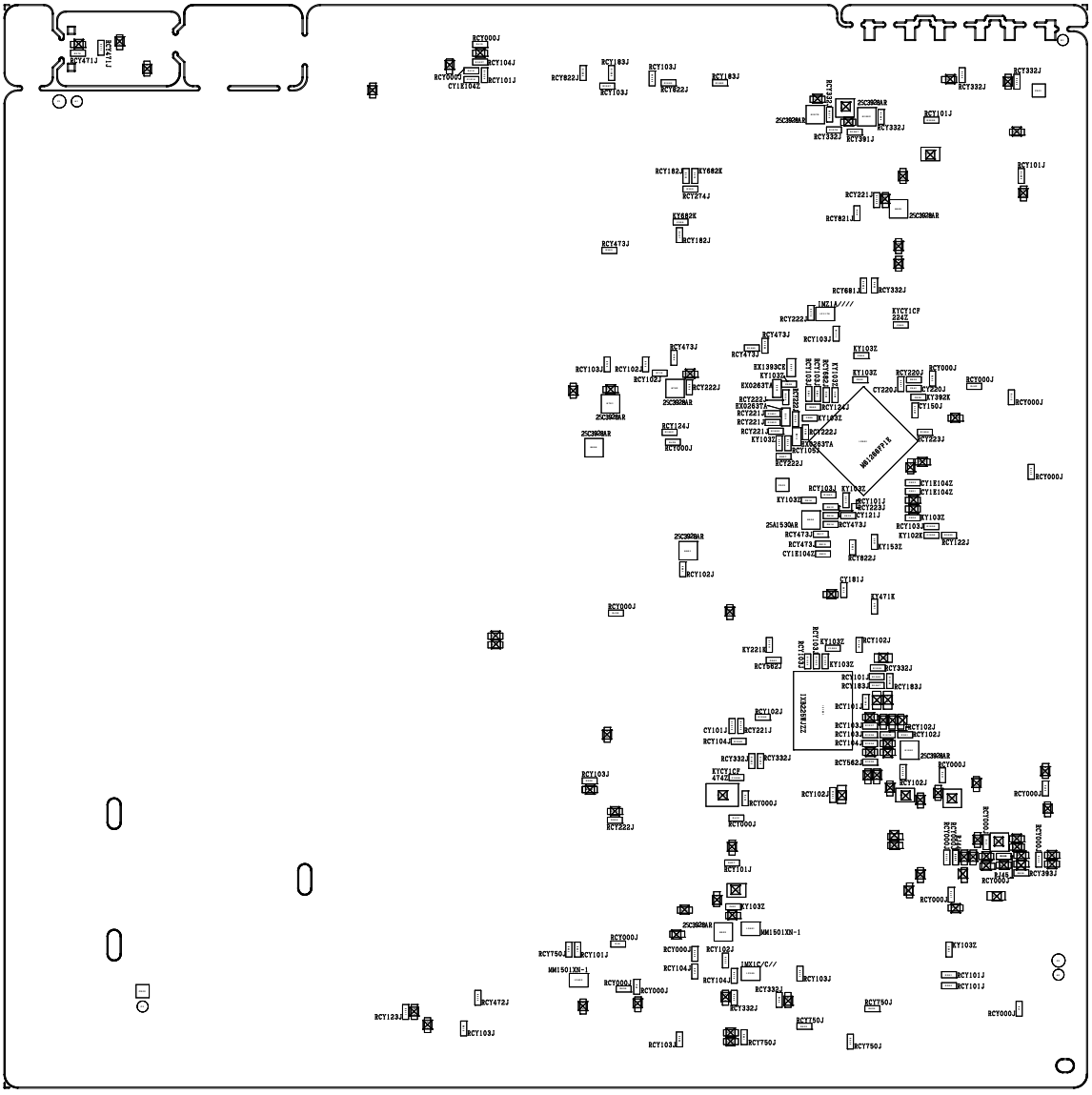


PRINTED WIRING BOARD ASSEMBLIES

PWB A : MAIN UNIT (COMPONENT SIDE)

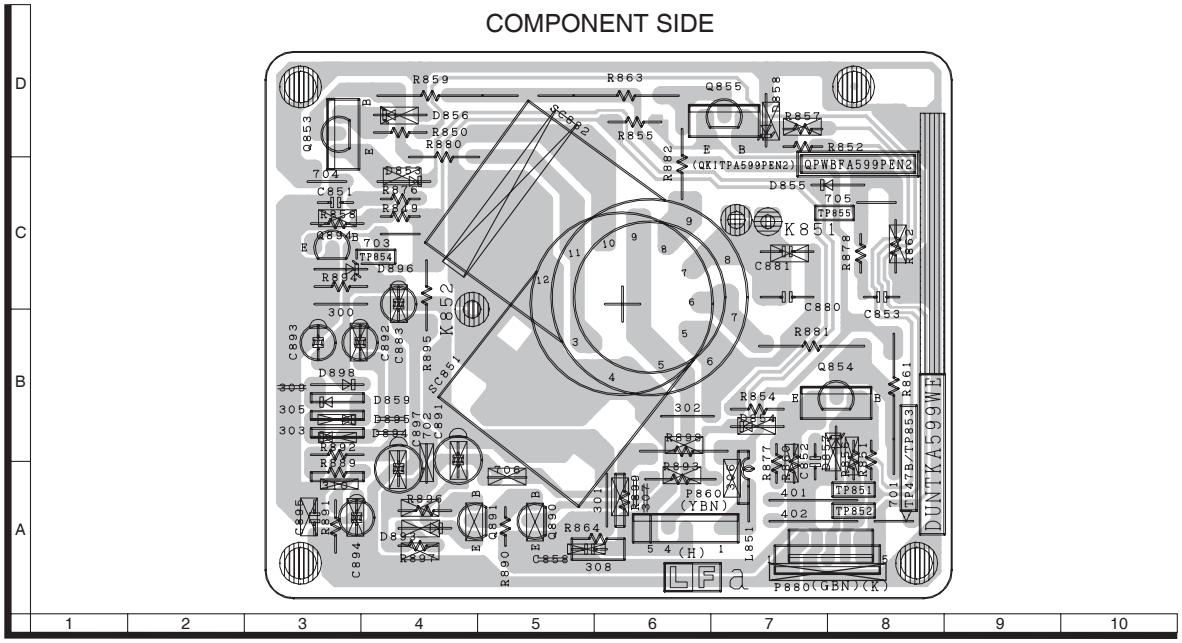


PWB A : MAIN UNIT (SHIP PART SIDE)



PWB B : CRT UNIT

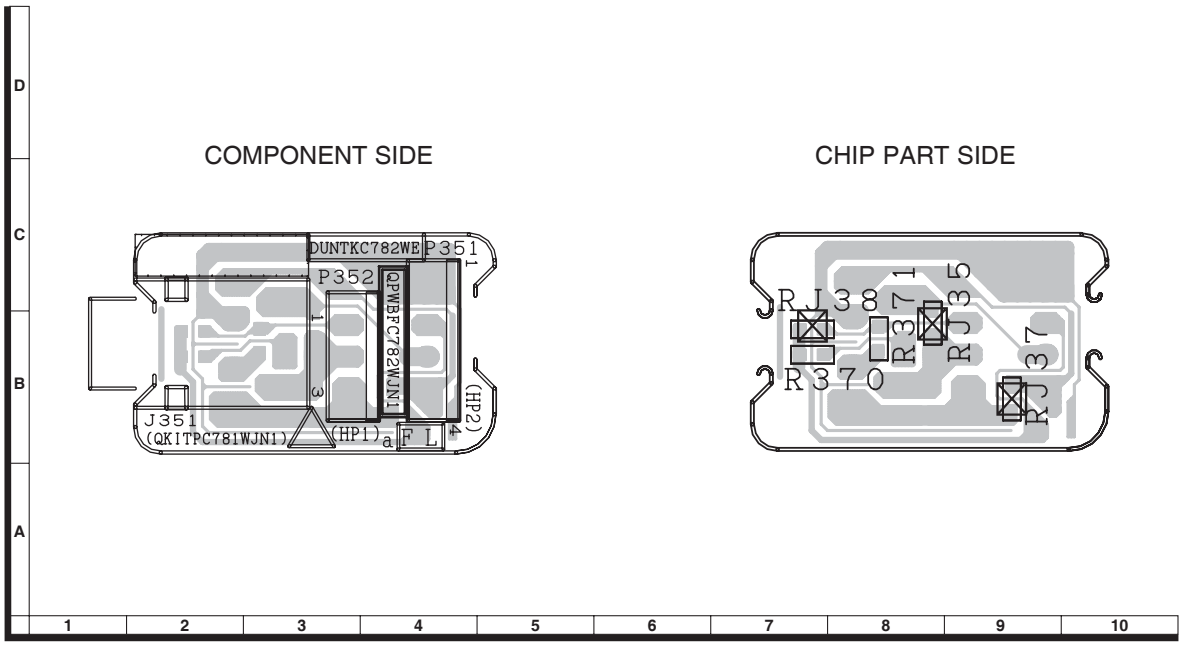
COMPONENT SIDE



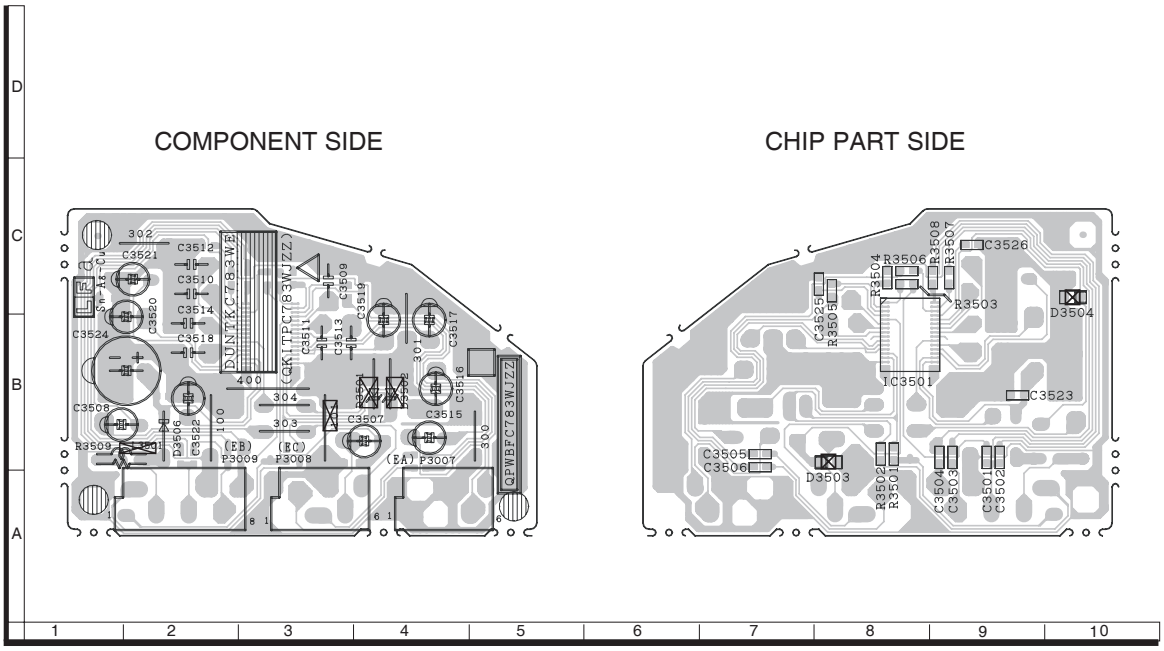
PWB C : HEADPHONE UNIT

COMPONENT SIDE

CHIP PART SIDE



PWB E : SOUND CONTROL UNIT



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